PARENT/CAREGIVER INVOLVEMENT IN 2018: PAST CHALLENGES AND FUTURE POSSIBILITIES IN A TECHNOLOGY-RICH SOCIETY

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The purpose of the study was to explore how the use of technology can support parent/caregiver-teacher communications, thus allowing for parent/caregiver-teacher involvement through contemporary approaches. The study looked at how parent/caregivers and teachers define parent/caregiver involvement, what they see as barriers to parent/caregiver involvement, and how they believe technology can support the involvement experience.

The review of literature examines varying factors that influence parent/caregivers' level of involvement in their children's schooling, as well as three major influences that have the greatest impact on student achievement: family, school, and community. It also identifies barriers to parent/caregiver involvement. Although challenges exist at the family, school, and community levels, the review of literature shows that the child receives maximum benefit when all parties collaborate.

Interviews and surveys reveal how parent/caregivers and teachers of third-graders feel about parent/caregiver involvement and how technology affects communications between parent/caregivers and teachers. Findings indicate that parent/caregivers and teachers believe the use of technology supports parent/caregiver-teacher communications, therefore fostering parent/caregiver involvement. They believe it eases communication processes and allows parent/caregivers to be involved despite busy schedules. Parent/caregivers and teachers communicated that they still desire personal conversations with one another to address topics of concern, but, overall, they feel technology cultivates and supports parent/caregiver involvement.

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PREFACE

I am extremely grateful for all who played a role in my completion of this dissertation. I would first like to give thanks to my advisor, Dr. Diane Kirk. Your wisdom and support guided my desire to research an area in which I might foster change. Thank you for your consistent guidance, respect, and kindness. I would also like to thank Dr. Charlene Trovato and Dr. Thomas Akiva for being a part of my committee. I am so appreciative of the role both of you played throughout my coursework as well as how you both pushed me to cultivate my work so that the results could truly have an impact in my workplace.

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Finally, I dedicate this to the memory of my parents, William and Karen Kleese, who were always my biggest fans. Your support of my every endeavor has made this possible.

1.0 INTRODUCTION

One of the most critical challenges our educational system faces is how to foster academic success for all students. Students bring their own stories with them to school each day, and it is often a puzzle for staff to determine how to give them a healthy, productive learning experience. Not only can students' learning paths be challenging, but their home experiences often elicit an entirely different set of challenges. So often, schools reach a point where they feel they have exhausted all options for supporting a student. In addition, all too often, schools point the arrow of blame outward, saying, "If only we could get the parent/caregivers involved. . . . "

Academically involved and engaged parent/caregivers are positive indicators in promoting student success (Ray & Smith, 2010, p.12) and are recognized worldwide as important to supporting positive literacy and educational outcomes (Hughes & MacNaughton, 2000, p. 241). Research shows that parent/caregiver involvement directly relates to student achievement (Englund et al., 2004; Fantuzzo et al., 1995; Marchant et al., 2001; McWayne et al., 2004 as cited in Quilliams & Beran, 2009, p. 72). Therefore, ensuring that parent/caregivers are involved with their children's schooling is vital.

However, a charge to "get parent/caregivers more involved" oversimplifies the issue. Parent/caregiver involvement is not solely reliant upon parent/caregivers, as schools must work to build partnerships with families so that parent/caregivers feel comfortable becoming involved. Schools must empower parent/caregivers to invest in their children's educational experiences. In

order to develop functional partnerships, school leaders must help teachers to understand the parent/caregivers better, including finding the most effective ways to maintain communication. Schools need parent/caregivers to be involved in their children's education, but many are not. Therefore, finding the most effective ways to streamline the communication process between parent/caregivers and teachers is key toward building relationships that can support students. In a world where technology is a driving force in communication, schools should explore how technology can support parent/caregiver involvement and engagement.

1.1 STATEMENT OF THE PROBLEM

Parent/caregivers do not always feel comfortable becoming involved in their children's school experiences. Schools establish a sense of community in ways that make sense to them, but a one-size-fits-all approach for parent/caregivers is not always effective.

One thing is certain: Regardless of their circumstances, parent/caregivers want their children to succeed, and students achieve more when parent/caregivers are involved (Mapp, 2003, p. 42; National PTA, 2000, p. 195). In order to develop parent/caregiver involvement practices that work for all families, it is critical for educators to understand what helps parent/caregivers to connect to their children's schooling, what they perceive to be effective communication practices, and why they are effective.

1.2 PURPOSE

The purpose of the study is to explore how parent/caregiver-teacher communications through technology influence parent/caregiver involvement. A review of literature indicates that parent/caregiver involvement programs, per se, are not universally successful due to the multitude of variables that exist. From parent/caregivers' personal circumstances, to schools' approaches to communication, to the specific teacher with whom a parent/caregiver must communicate, multiple factors affect the overall concept of "parent/caregiver involvement." After exploring these issues through an extensive literature review, this study focuses on the role that technology plays in parent/caregiver-teacher communications as one component of parent/caregiver involvement.

The review of literature shows that parent/caregivers' initial interactions with their children's schools can influence whether or not their involvement has a positive impact on their children's school experiences (Hoover-Dempsey & Sandler, 1997, p. 4). It also shows that collaboration maximizes the student's experiences (Epstein, 1995). Therefore, it is necessary to focus on the interactions between parent/caregiver and teacher.

Additionally, the review of literature shows that varying approaches to communication between teachers and parent/caregivers render inconsistent results. Communication through technology, however, has the potential to foster more involvement. Therefore, this study will also compare parent/caregivers and teachers' opinions regarding when and how schools can use technology. By considering parent/caregivers and teachers' responses regarding parent/caregiver involvement and the use of electronic communication, the goal is to use the findings to guide schools in their interactions with parent/caregivers. Ultimately, if schools are aware of what parent/caregivers say are the most effective communication practices, they can develop

programming that best meets the needs of all parties involved, which allows parent/caregivers to become more involved.

1.3 RESEARCH QUESTIONS

1. How do parent/caregivers and teachers define parent/caregiver involvement?
2. What do parent/caregivers and teachers define as barriers to parent/caregiver involvement?
3. How does the district use technology for parent/caregiver communications?
4. Do parent/caregivers and teachers view the use of technology as a communication method that promotes parent/caregiver involvement?

1.4 DEFINITIONS AND KEY TERMS

Community – sense of belonging based on the concepts of social bonding, geographic location, and the sharing of something (Preston, 2013, p. 413).

Cultural capital – linguistic and cultural competence (Dumais, 2002, p. 44); serves as a power resource, or a way for groups to remain dominant or gain status (p. 46).

Ethnocentrism – how humans tend to function only in the context of their own understanding:

> Like me/not like me illustrates the concept of *ethnocentrism*, in which our own cultural norms and systems of belief are viewed as right and normal. The more

someone is *like* us, the more we understand and the better we accept that person.

The more someone is *not like* us, the more we will doubt him or her. (Rudney, 2005, p. 61)

Connectedness – a sense of belonging at school (Giano, et al., 2018, p. 3).

Parent/caregiver – refers to the primary caregiver of a child.

Parent/caregiver involvement – families feeling connected to their children's schools; the participation of parents in regular, two-way meaningful communication involving student academic learning and other school activities (U.S. Department of Education, 2004, p.3).

Parental self-efficacy – refers to parent/caregivers' beliefs about their ability to help their children succeed in school (DeLoatch, 2015, p. 277).

Role construction – the role (parent/caregivers) see themselves playing in their children's academic careers (Hoover-Dempsey & Sandler, 1997, p. 8).

Teacher self-efficacy – an assessment of one's capabilities to attain a desired level of performance in a given endeavor (Tschannen-Moran & Hoy, 2007, p. 945).

2.0 REVIEW OF THE LITERATURE

The review of literature describes the multiple factors that influence parent/caregivers' involvement in their children's school experiences. Specifically, researching the concept of parent/caregiver involvement from the perspectives of a child's home, school, and community helps educators to understand the challenges that exist for parent/caregivers and school staff, and the limitations that exist at the federal, state, and local levels. The review of literature frames a need to explore how schools might begin to improve their interactions with parent/caregivers in order to help them feel more connected and, thus, more comfortable getting involved. This review first focuses on models that describe why effective parent/caregiver and school interactions are vital. Next, the review of literature explores the parent/caregiver involvement challenges faced by parent/caregivers and schools, and within the community. Finally, the review of literature reveals a possible in-road in today's technological world by acknowledging how electronic communications can support the overall efforts to involve parent/caregivers in their children's educational experiences.

2.1 MODELS OF THE PARENT/CAREGIVER INVOLVEMENT PROCESS

2.1.1 Hoover-Dempsey and Sandler's patterns of influence

Parent/caregiver involvement is a term that holds different meanings for different people. When considering parent/caregiver involvement in the context of the school setting, one might think of parent/caregivers volunteering in the school, or parent/caregivers helping their children with homework. Others might believe that involved parent/caregivers view the teachers as the experts and choose not to interfere with the teachers' work. For the purpose of this research, the context of parent/caregiver involvement pertains to the initial interactions between home and school – the idea of families feeling comfortable enough with their children's schools that they are willing to participate in regular two-way meaningful communication involving student academic learning and other school activities (U.S. Department of Education, 2004, p. 3).

Using this definition, parent/caregiver involvement is not solely reliant upon parent/caregivers, as schools must work to build partnerships with their families so that parent/caregivers feel comfortable becoming involved. Hoover-Dempsey and Sandler (1997) developed a model (see Figure 1) that suggests there are "patterns of influence" (p. 3) at critical points in the parent/caregiver involvement process. Their model contains five levels in the involvement process, showing the initial influences that impact parent/caregivers' decisions to become involved (Level 1), and working through a process by which parent/caregivers' involvement can potentially influence their children's educational outcomes (Level 5).

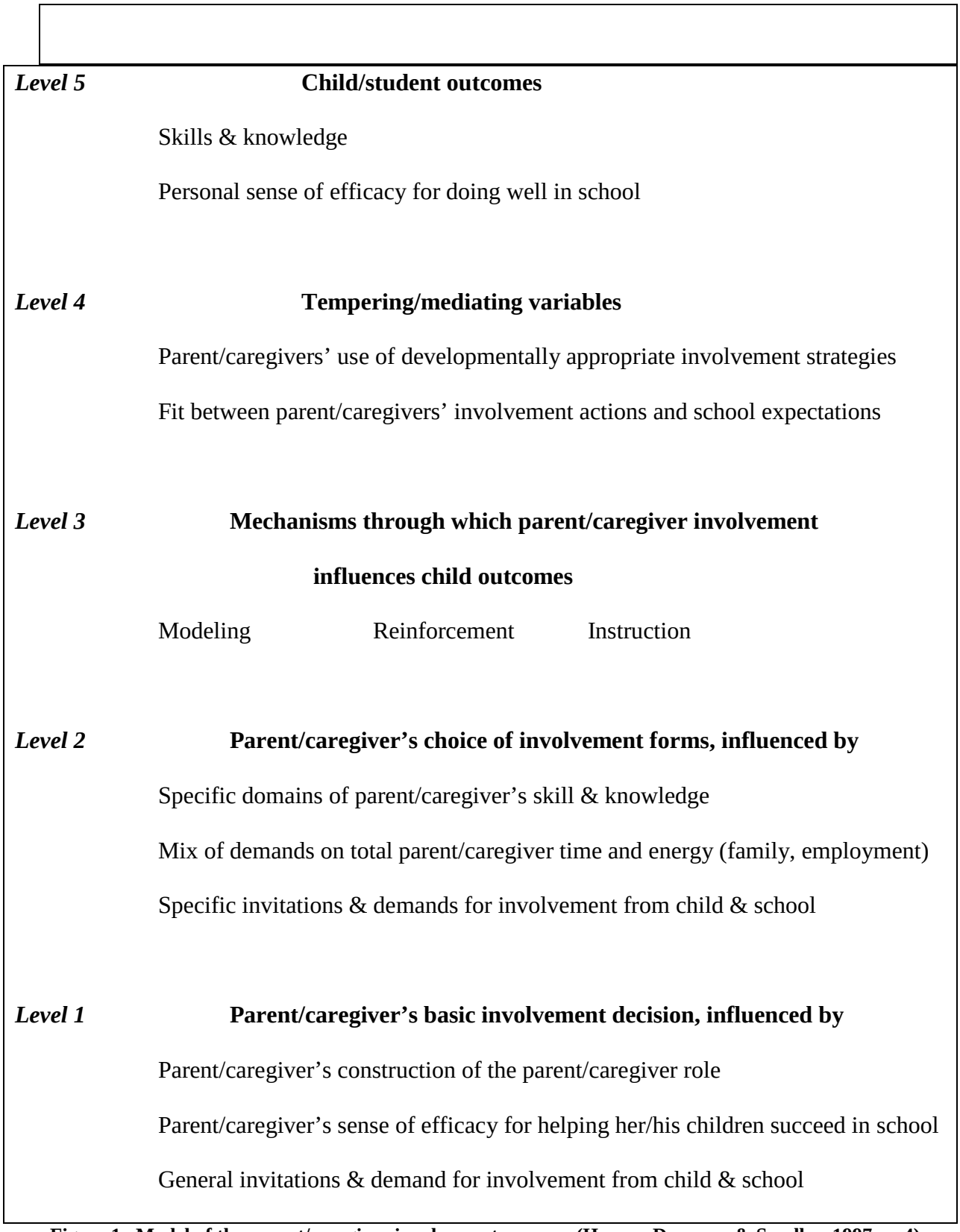

Figure 1. Model of the parent/caregiver involvement process. (Hoover-Dempsey & Sandler, 1997, p. 4)

Hoover-Dempsey and Sandler's (1997) model provides explanation for both the explicit and implicit decisions parent/caregivers make regarding parent/caregiver involvement. They explain that parent/caregivers are "sometimes explicitly reflective, aware and active in relation to their decisions about being involved in their children's education; in other circumstances, they appear to respond to external events or unevaluated demands from significant aspects of the environment" (p. 6). The first level of the parent/caregiver involvement model describes the constructs necessary for parent/caregivers to choose to become involved – what opens them to becoming involved. The second level describes the types of parent/caregiver involvement and the learning forms parent/caregivers use during involvement activities – what prompts or stifles their involvement. The third level describes the mediating variable in a parent/caregiver's approach that can support positive outcomes. The fourth level describes student attributes conducive to achievement. The fifth level describes student outcomes because of the involvement (Hoover-Dempsey & Sandler, 1997, p. 4). The progression of this model demonstrates how a parent/caregiver not only must become open to being involved, but other experiences that help parent/caregivers to feel welcomed and, eventually, effective in being involved. The model also shows that one must consider other outside factors when considering a parent/caregiver's potential involvement and effectiveness, such as other demands on the parent/caregivers and the child's willingness to accept support from the parent/caregiver.

2.1.2 Epstein's overlapping spheres of influence

Hoover-Dempsey and Sandler's (1997) model of the parent/caregiver involvement process complements Epstein's (1995) model for parent/caregiver involvement. Especially within levels three and four of Hoover-Dempsey and Sandler's (1997) model are several assumptions about

the interactions and relationships among students, parent/caregivers, school staff, and outside influences. Epstein's model identifies three major influences that have the greatest impact on student achievement – family, school and community – calling them "overlapping spheres of influence" (p. 702). She posits that the responsibility in parent/caregiver involvement should not fall solely on the parent/caregiver when it comes to a student's school experiences. Rather, as Figure 2 depicts, collaboration among school, home, and community promotes academic success for all students. In this sense, Epstein's model provides a global vision of partnership in which Hoover-Dempsey and Sandler's (1997) model demonstrates "parent/caregiver sense of efficacy and role construction" (Deslandes, 2001), which allows parent/caregivers to develop their understanding of how much and how well they will support their children in the school setting.

Figure 2. Epstein's overlapping spheres of influence depicts how the child benefits when the school, family and community work together (Epstein, 1995)

As the model illustrates, maximum overlap and benefit occur when there is a true partnership among the three as they work collaboratively to support children. Conversely, when minimal overlap occurs, each entity operates in isolation from one another and renders less benefit. In short, when schools, families, and communities support children together, "children tend to do

better in school, stay in school longer, and like school more (Henderson & Mapp, 2002, p. 7). This description of the interplay among schools, families, and communities defines the use of the phrase "parent/caregiver involvement" in this study: families feeling connected to their children's schools, and families, schools, and communities coming together to work toward the common cause of helping children achieve in their educational experience. As models one and two show, many people, variables, and influences affect parent/caregiver involvement. Approaches to parent/caregiver involvement that work for some do not work for others. What worked last year may not work this year. What worked in one setting may not work in another.

This literature review will address parent/caregiver involvement in Epstein's (1995) three spheres of influence, with consideration for Hoover-Dempsey and Sandler's (1997) parent/caregiver involvement process, and will consider the challenges that are present for families, schools, and communities in their efforts to support children as learners. The first sphere is the parent/caregiver and family. Regardless of ethnic/racial background, socioeconomic status, or the parent/caregivers' educational level, parent/caregivers want their children to succeed, and students achieve more when parent/caregivers are involved (National PTA, 2000, p. 195). However, schools with high numbers of students living in poverty and with high minority enrollment report less positive parent/caregiver involvement than more affluent schools (Epstein, 1995, p. 703). It is critical for schools to understand the impact that demographics have on parent/caregiver involvement. Therefore, this literature review will focus on the specific barriers that parent/caregivers face due to varying demographic factors. Socioeconomic status, education level, race, home language, family structure, and job responsibilities will all be explored to determine what impacts parent/caregivers' feelings of connectedness and what barriers exist between parent/caregivers and school systems.

The second sphere of influence in which to explore parent/caregiver involvement is the school setting. Since no two schools are alike, it is important for every school to determine how they can build the capacity for partnerships. This review will show how teachers' beliefs, skills, knowledge, and self-efficacy can affect parent/caregiver involvement.

Finally, the third sphere of influence, community, will explore community-wide efforts to foster student achievement and the challenges those efforts present. Epstein (2010) argues that a family-school-community plan should include the following six types of partnerships: Type 1-Parenting, Type 2-Communicating, Type 3-Volunteering, Type 4-Learning at home, Type 5-Decision-making, and Type 6-Collaborating with the community (p. 46). From Type 1 to Type 6, the partnerships shift from mainly home-based communication relationships to those that reflect partnerships among parent/caregivers, schools, and community agencies, where the role of communication shifts from persuasion to partnership-building (Barge & Loges, 2003, p. 142). This review will consider these six partnerships while exploring federal, state, and local influences on parent/caregiver involvement.

2.2 CHALLENGES FOR PARENT/CAREGIVERS

Hoover-Dempsey and Sandler (1997) explain that key events in parent/caregivers' experiences with school involvement can impact parent/caregivers' role construction – the role they see themselves playing in their children's academic careers (p. 8). In turn, their role construction affects their feelings of efficacy – how effective they believe they are at supporting their children (p. 8). Finally, offers, requests, and opportunities for parent/caregiver involvement presented by the child and the school impact parent/caregivers' decisions to become involved (p. 8). Their

experiences can both reinforce and promote further involvement, or they can stifle parent/caregivers' willingness to be involved. These variables influence parent/caregivers' involvement within the physical school setting, as well as their willingness or ability to follow through with the school's expectations at home. Some parent/caregivers believe they carry the main responsibility for their children's school achievement. Others believe that a partnership with schools is the best approach. Still others believe it is the school's responsibility to handle all educational experiences for their children and to attempt to interfere would be disrespectful. Socioeconomic status, education level, race, language, family structure, and job responsibilities can all influence parent/caregivers' basic involvement decisions and forms (Hoover-Dempsey & Sandler, 1997, p.3). Each factor presents unique challenges to parent/caregivers in relation to their children's school experiences. These factors also influence to what extent parent/caregivers believe they are effective in their role at supporting their children in school.

2.2.1 Socioeconomic status

Family socioeconomic status (SES) strongly influences parent/caregiver involvement (Boethel, 2003, as cited in Berthelsen & Walker, 2008). Research indicates that lower-income parent/caregivers tend to be less involved in their children's education (Berthelsen & Walker, 2008; Reynolds, et al., 1992, as cited in Izzo et al., 1999, p. 820; Williams & Sanchez, 2011) and tend to have poorer quality relationships with teachers than higher-income parent/caregivers (Kohl, et al., 1997, as cited in Izzo et al., 1999, p. 820).

Vogels (2002) identified four levels of participation groups of parent/caregivers based upon socioeconomic status (SES). "Partners" were highly active in both formal and informal school activities and were more likely to have high SES; "participants" were highly involved in

informal activities at the school, and were middle to high SES; “delegators” viewed teachers as the experts, responsible for their children’s education; and “invisible parent/caregivers” were not engaged or visible in the school, and were primarily low SES (Vogels, 2002, as cited in Berthelsen & Walker, 2003, p. 35). Based upon Vogels’ (2002) categories, low SES parent/caregivers would tend to fit into the “delegators” or “invisible parent/caregivers” categories. This is because they often feel alienated from school staff both culturally and educationally (Izzo, et al., 1999, p.820). Thus, when low SES is a known demographic detail for parent/caregivers, it is important to understand the factors that may present challenges to parent/caregivers of low SES. One of the most obvious involvement challenges is that finances may literally limit parent/caregivers’ ability to attend events at school. Low-income parent/caregivers may not be able to afford childcare or public transportation to get to school for a meeting or special event (Strauss, 2013). Depending on their community, availability of public transportation may also provide a challenge. Lack of income can potentially affect other methods of parent/caregiver involvement as well. One example is when teachers ask parent/caregivers to provide classroom supplies for their children, gifts for a holiday gift exchange, or money for a book fair. Parent/caregivers may perceive that they are not able to be fully involved in their children’s education when they do not have the financial means to support what the school is asking of them. Parent/caregivers’ lack of financial means also creates a barrier when parent/caregivers avoid school participation due to owing the school money for various school fees (Williams & Sanchez, 2011, p. 64).

SES is a unique barrier to parent/caregiver involvement in that it can also be the root of other barriers. Parent/caregivers’ education level and job responsibilities, for example, can also be barriers to parent/caregiver involvement.

2.2.2 Education level

Economic disadvantage often correlates with lower formal education levels (Berthelson & Walker, 2008, p. 35). Parent/caregivers with low levels of education may become less involved at school because "they feel less confident about communicating with school staff owing to a lack of knowledge of the school system, a lack of familiarity with educational jargon, or their own negative educational experiences" (Lee & Bowen, 2006, p. 198; Stacer & Perrucci, 2013, p. 342). Unfamiliar acronyms and formal terminology for special education services, curriculum, and/or assessments can reinforce a parent/caregiver's feelings of insecurity. Meetings with administration may also be uncomfortable for parent/caregivers if recollections of their own school experiences with principals and school staff were negative. Especially at the middle and high school levels, less educated parent/caregivers tend to be less involved because they are not knowledgeable about their children's curriculum (Griffin & Galassi, 2010, p. 87).

As Vogels (2002) describes, low SES parent/caregivers who have limited education also tend to view teachers as "experts" in their children's education (Berthelson & Walker, 2008, p.35; Crozier,1999, as cited in DeLoatche et. al, 2015, p. 277), thereby causing parent/caregivers to hesitate to impose their own opinions regarding what is best for their children's education. Parent/caregivers may hesitate to follow their instincts in supporting their children at home, feeling uncertain about their ability to support their children in comparison to the teacher. Feelings of self-efficacy diminish (or become non-existent) as the parent/caregiver remains removed from the school setting, continuing to defer to the teacher rather than becoming involved.

2.2.3 Job responsibilities

Working parent/caregivers face several challenges when it comes to parent/caregiver involvement as well. Concerning school events or meetings, parent/caregivers may not be able to afford to take unpaid time off from work (Strauss, 2013) or may have less flexible work schedules (Williams & Sanchez, 2011, p. 55). Williams and Sanchez (2011) describe the working parent/caregivers' struggle by using the term "time poverty," referring to the lack of free time parent/caregivers have to dedicate to school concerns (p. 55). In their study, which involved 25 parent/caregiver interviews, parent/caregivers reported time poverty as more of a barrier than school staff, noting that they could not attend school activities during the day due to their work schedules (p. 62). The parent/caregivers in this particular study also identified other factors that consumed their time, including substance abuse problems, time with other children, and time with their significant others (p. 63).

2.2.4 Race and culture

Race and culture can present multiple barriers to parent/caregivers' attempts at parent/caregiver involvement. Statistics show that, in regard to parent/caregivers' connections to school, "minorities are less involved, less represented and less informed, and are less likely to have access to resources, as well as more likely to have problems associated with language, transportation, communication and child care" (Hornby & Lafaele, 2011, p. 41). When parent/caregivers are not connected to the traditional types of involvement that teachers expect, such as attending parent/caregiver-teacher conferences or helping with homework, "educators are quick to judge culturally, linguistically and economically diverse parent/caregivers as

‘uncaring’, ‘unsupportive’ and ‘not valuing education” (Guerra & Nelson, 2013, p. 428). As a result, schools offer parent/caregiving classes or other corrective advice regarding how to become more involved in their children’s schooling. Parent/caregivers eventually get the message that “families are to be taught and fixed rather than understood” (Daniel-White, 2002, as cited in Guerra & Nelson, 2013, p. 429).

This description applies to Latino families, according to Guerra and Nelson (2013). They explain that many Latino families take a collectivist approach to parent/caregiver involvement. That is, they see educators and parent/caregivers as having very distinct roles: educators address the academics, and parent/caregivers socialize their children’s behavior (p. 429). The collectivist belief is to leave academics to the teacher, as getting involved in a child’s academics can potentially cause more harm than good (p. 429).

Asian-American families show a different way that culture can affect parent/caregiver involvement. Asian-American parent/caregivers tend to be the least engaged in the school setting. Rather, they focus their efforts at home and utilize social networks within their communities to seek academic support for their children (p. 425; Sohn & Wang, 2006, p. 128). Without understanding this internal support system, school staff may perceive an Asian-American parent/caregivers’ lack of visibility at school as disengagement.

Urban minority parent/caregivers’ differing perceptions of school experiences, compared to those of school staff, also have an impact on parent/caregiver involvement (McKay et al., 2003, p. 107-108). McKay et al. explored parent/caregivers and teachers’ perceptions of parent/caregiver involvement, racial socialization, and social support. The study compared parent/caregiver and teacher responses to one another, noting similar and contrasting perceptions. The results showed an extreme contrast between parent/caregivers and teachers’

perceptions of racism. Parent/caregivers perceived twice as much racism in the school setting in comparison with teachers' perceptions. Thus, relative to parent/caregiver involvement at school, racism awareness of parent/caregivers could deter them from having contact with school staff or attending school events (McKay et al., 2003, p. 107-108).

These contrasting experiences and perceptions raise concerns about "the extent to which some ethnic, low-income minorities will engage in institutional processes defined by dominant cultural norms and frames of reference" (Ogbu, 1995a, 1995b, as cited in Lawson, 2003, p. 82). Malone (2015) supports this point by explaining that if teachers do not properly acknowledge students' cultural backgrounds, students tend not to be academically successful (Gibson, 2008, as cited in Malone, 2015, p. 17). It is not surprising that students perform better in learning environments in which they believe educators welcome and value them for their respective cultures (p. 17). Additionally, as in the study regarding racism awareness (McKay, et al., 2003), research shows that a difference in ethnic backgrounds has the potential to affect parent/caregiver and teacher relationships, especially when the teacher is the ethnic majority and the parent/caregiver is the ethnic minority (Thijs & Eilbracht, 2012, p. 797). In a study conducted by Thijs and Eilbracht (2012), in which they explored quality of relationships between teachers and parent/caregivers of varying ethnicities, they found that fewer teachers and parent/caregivers reported positive relationships between majority-culture teachers and African-American or Hispanic-American parent/caregivers in contrast to European-American parent/caregivers. Teachers reported fewer positive relationships with African-American parent/caregivers than any other parent/caregivers (p. 797).

Hornby and Lafaele (2011) cite "cultural capital" as a possible explanation. Cultural capital refers to having assets that promote social status, such as level of education, intellect, or

physical appearance. “Just as economic capital represents the power to purchase products, cultural capital for parent/caregivers in terms of their children’s education represents the power to promote their academic enhancement” (Grenfell & James, 1998, as cited in Lee & Bowen, 2006, p. 197-198.) In relation to parent/caregiver involvement, cultural capital refers to the fact that parent/caregiver involvement is defined in white middle-class terms. Thus, it is not surprising when schools perceive white middle-class parent/caregivers as the participants who “do it” best (Bastiani, 1989, as cited in Hornby & Lafaele, 2011, p. 41; Lareau & Horvat, 1999, p. 38). The authors assert that parent/caregivers who lack cultural capital, as it is conceptualized in the majority culture, such as working-class minorities, tend to understand that home-school relationships are about separateness rather than interconnectedness; this difference clearly impacts parent/caregivers’ attitude toward parent/caregiver involvement (Hornby & Lafaele, 2011, p. 41).

Other barriers faced by African-American families result from the interactions between parent/caregivers and school personnel. Parent/caregivers reported feeling isolated, alienated, and disengaged at their children’s schools, and acknowledged feeling that they were treated like second-class citizens (Williams & Sanchez, 2011, p. 56). In some cases, these negative experiences stemmed back to parent/caregiver’ own negative experiences as students (Lightfoot, 1978, as cited in Williams & Sanchez, 2011, p. 56).

2.2.5 Language

In some cases, parent/caregivers face not only the challenges of being a minority but also often face the additional barrier of language differences. The lack of translation services poses a problem unique to families whose first language is not English (Lee & Bowen, 2006, p. 198).

Stories from four parent/caregivers affirm that language barriers considerably affected their parent/caregiver involvement experiences (Harris, 2014). Parent/caregivers reported that they find it difficult to form meaningful, productive relationships with their children's teachers for several reasons. Parent/caregivers reported feeling embarrassed by their inability to speak fluent English and frustrated by the insufficient accommodations provided by the schools (Harris, 2014, p. ii). In this study, the parent/caregivers' stories reveal a significant deficit on the part of the school system, with "ineffectual translation services, a lack of cultural sensitivity, and banal community-building initiatives aimed towards Latino families" (p. ii).

Pena (2000) adds other ways that the language barrier may affect Hispanic parent/caregivers. Parent/caregivers' lack of English fluency and lack of education limit their ability to help their children with their schoolwork (p. 44). Additionally, the language barrier and lack of bilingual staff can leave parent/caregivers feeling powerless (Chavkin & Gonzalez, 1995, as cited in Pena, 2000, p. 44) and can lead them to believe that school staff is ignoring their ability and culture (Stacer & Perrucci, 2013, p. 342).

Finally, six Korean immigrant mothers who participated in extensive interviews regarding parent/caregiver involvement reported the language barrier as the biggest challenge in communicating with teachers and participating in school activities (Sohn & Wang, 2006, p. 128). One parent/caregiver noted that she was frustrated with her attempts to communicate with her child's teacher because the teacher often did not understand her English (p. 128). The communication was also difficult because of the mother's reported difficulty with understanding educational terms and norms for communicating with teachers (p. 128).

2.2.6 Family structure

The single-parent/caregiver dynamic is another angle to parent/caregiver differences that affect parent/caregiver involvement. In a study of 16 school districts in Maryland, Epstein (1985) surveyed and interviewed teachers, principals, and parent/caregivers regarding parent/caregiver involvement. The study found that school demands placed a unique burden on the single parent/caregiver. There was a key difference *not* in the number of minutes that single parent/caregivers versus married parent/caregivers spent working with their children; rather, the difference was in what the teachers expected of the parent/caregivers. Epstein noted that the teachers who believed that the parent/caregivers lacked the ability or willingness to help actually made more demands on single parent/caregivers and rated single parent/caregivers as less helpful and less responsible (Epstein, 1984b, as cited in Epstein, 1985, p. 21). Single parent/caregivers, then, bore a burden of responsibility beyond that of married parent/caregivers when their efforts were similar or even greater than those of other parent/caregivers.

Each of these areas demonstrates challenges for parent/caregivers that greatly influence their ability to support their children in school. When these challenges limit parent/caregiver involvement, parent/caregivers are not able to become fully involved and they are "less likely to gain the social, informational, and material rewards gained by parent/caregivers who enact the school involvement role" (Lee & Bowen, 2006, p. 198). Parent/caregivers generally value education and want their children to succeed in school (Grenfell & James, 1998, as cited in Lee & Bowen, 2006, p. 198). Therefore, it is important to consider these challenges and work to find ways to alleviate the barriers that exist for parent/caregivers.

2.3 CHALLENGES FOR SCHOOLS

School districts take on a different perspective from parent/caregivers as they aim to promote parent/caregiver involvement. Because schools have maintained the same systems and practices for decades, parent/caregivers must "fit" into the school's mold rather than the school attempting to "fit" its families. Schools may wish for parent/caregivers to feel connected but often do not consider *with whom* they are communicating, *how* they should be communicating with them, or *how* the communication will be received. Thus, school districts face multiple internal challenges when it comes to laying the necessary foundation for parent/caregivers to feel comfortable with involvement. Studies show that the greater the school's effort to inform parent/caregivers of how to be involved, the greater the parent/caregiver involvement and attendance at school events (National PTA, 2000, p. 19). In addition, the benefits go beyond just an increase in attendance and parent/caregiver involvement. When parent/caregivers communicate productively with teachers and join in school activities, "they gain a clearer understanding of what is expected of their children at school and they may learn from teachers how to work at home to enhance their children's education" (Izzo, et al.,1999, p. 820). Unfortunately, several barriers within school systems inhibit productive parent/caregiver involvement between parent/caregivers and teachers.

2.3.1 Teacher beliefs

Rudney (2005) describes the first internal challenge through the term "ethnocentrism" as an explanation of how humans tend to function only in the context of their own understanding:

> Like me/not like me illustrates the concept of *ethnocentrism*, in which our own cultural norms and systems of belief are viewed as right and normal. The more someone is *like* us, the more we understand and the better we accept that person.

The more someone is *not like* us, the more we will doubt him or her. (p. 61)

"Ethnocentrism" labels the challenge that teachers and parent/caregivers feel when their beliefs differ regarding *how* to support a child in school. In addition, since there are a variety of ways in which parent/caregivers can be involved, the variety of perspectives can create conflict, especially when considering cultural differences (Pomerantz, Moorman, & Litwack, 2007, as cited in Malone, 2015, p. 14). For example, while school leaders readily discuss parent/caregiver involvement with teachers (Reynolds, 1991, as cited in Izzo, et. al, 1999, p. 817), their own beliefs about children's school performance can easily bias their assessments of parent/caregivers (Izzo, et. al, 1999, p.817). One must consider these factors in relation to teachers' feedback.

One way in which varying definitions and perceptions of parent/caregiver involvement can be a challenge is that minority or ethnic subgroups may have views of parent/caregiver involvement that differ from those of their white counterparts (Malone, 2015, p. 15). For instance, while white families tend to engage more frequently in activities within the school setting, other ethnicities actively participate in their children's education by helping them at home (p. 15). Both of these are examples of parent/caregiver involvement, yet a minority parent/caregiver's lack of visibility in the school setting may be perceived as a lack of interest by the teacher. Thus, "we find that educators are still placing the blame on the parent[/caregivers] for their children's academic failures, especially parent[/caregivers] from low-income and minority backgrounds" (Lazar & Slostad, 1999, as cited in Gonzalez-DeHass & Willems, 2003, p. 91).

A typical parent/caregiver-teacher conference provides another example. Parent/caregiver-teacher conferences can be especially intimidating to low-income or minority

parent/caregivers. School personnel arrange the meetings and hold them on school turf (Gonzales-DeHass & Willems, 2003, p. 93). Parent/caregivers are asked to enter a setting in which they are not necessarily comfortable, where their children's academic successes and challenges are discussed. School staff typically use educational jargon with which parent/caregivers are not always familiar to discuss the child's progress.

Parent/caregiver-teacher conferences also provide a good example of how the goals and focus of parent/caregivers and teachers can differ during their meetings. For example, teachers' goals for these meetings typically include describing children's progress, both achievements and difficulties: finding out how children are handling school, establishing how parent/caregivers can help their children at home, and identifying possible conflicts with parent/caregivers (Bastiani, 1989, as cited in Hornby & Lafaele, 2011, p. 44). Parent/caregivers, on the other hand, while wishing to hear about achievements and difficulties, also want to compare their children's achievement to others in the class, learn more about instructional methods and school practices, and discuss any concerns they have (p. 44).

These are just a few examples of scenarios that occur regularly when educators lack an understanding of how school practices can unknowingly deter parent/caregivers from becoming or remaining involved. As Gonzales-DeHass and Willems (2003) advise, "Teachers need to be apprised of the cultural disparities in parent[/caregiver] involvement that do exist, so that they are prepared to interact with and involve parent/caregivers in culturally sensitive ways" (p. 93). With a better understanding of the potential differences in perception of parent/caregiver involvement, teachers can reflect on their own belief systems, consider how their assumptions might be detrimental to parent/caregiver involvement (p. 91), and adjust their practices to become more sensitive to all parent/caregivers' perspectives.

2.3.2 Teacher skills and knowledge

Educators' restricted understanding of factors that affect parent/caregiver involvement leads to a larger-scale barrier: a lack of training. For example, consider Epstein's (2010) six family-school-community partnerships: parent/caregiving, communicating, volunteering, learning at home, decision-making, and collaborating with the community (p. 46). A teacher with limited understanding of her students' backgrounds will have a difficult time understanding how these six partnerships might affect one parent/caregiver differently from another. Educators require training in order to develop the strategies necessary to relate to parent/caregivers in a way that makes them feel comfortable. Without such training, "educators may not be able to recognize and encourage forms of parent[/caregiver] involvement that have a strong cultural basis or influence" (Malone, 2015, p. 15). Sleeter (2001) suggests this in her review of research on pre-service teacher preparation for multicultural schools: Even when officials have worked to prepare their staff to work with diverse populations, some educators still report not feeling sufficiently trained to do so (p. 95). In fact, many pre-service and in-service teachers come away from professional development feeling even less effective than before (p. 95). This situation describes a system that is generally not used to working with parent/caregivers who are different from their teachers.

Population trends also point to the need for teachers to communicate more effectively with diverse families. As national statistics show, the demographics in American schools continue to change. In the fall of 2014, the overall number of Latino, African-American, and Asian students in public K-12 classrooms surpassed the number of non-Hispanic whites for the first time (Maxwell, 2014). In a study of enrollment from fall 2003 through fall 2013, the U.S. Department of Education National Center for Educational Statistics (NCES) (2015) reports that

the percentage of Hispanic students increased from 19 percent to 25 percent, Black students decreased from 17 percent to 16 percent, and White students decreased from 59 percent to 50 percent (U.S. Department of Education, 2015). The percentage of white students was lower in 2013 than 2003 in all 50 states (U.S. Department of Education, 2015). In contrast, the NCES (2013) reports that 81.9 percent of all teachers are white, with 7.8 percent Hispanic, 6.8 percent black, and all other ethnicities less than 2 percent each. The minority population of students continues to grow, specifically the Hispanic population, while white teachers continue to be the majority population of teachers.

This change in demographics signals the need to address cultural competence for all teachers (Maxwell, 2014). As discussed in the previous section, parent/caregivers from minority races, cultures, and SES have varying approaches to helping their children. Educating teachers to understand these differences will foster a greater sense of understanding in the teacher. This will help to address the next challenge for schools, which is the current attitude of educators regarding parent/caregiver involvement. Due to a historical lack of success in developing effective parent/caregiver involvement practices, many educators do not see its value. For example, “some principals have had enough discouraging experiences with parent[/caregiver] involvement that they feel weary of trying to include or involve parent/caregivers as partners” (Gonzalez-DeHass & Willems, 2003, p. 92). Additionally, teachers describe their hesitation in creating too many parent/caregiver involvement activities for the problems that arise when not all students will receive the necessary parent/caregiver assistance (p. 93).

2.3.3 Teacher self-efficacy

A teacher's personal sense of teaching efficacy is also key to effective parent/caregiver involvement. Teachers who do not have confidence in their ability to be change agents with their students are less persistent and less willing to provide opportunities for parent/caregiver involvement (Hoover-Dempsey, et al., 2002, p. 845). Further, teachers who are uncertain of their skills in dealing with "traditional" families may struggle even more so when working with families perceived as different from the "norm" (p. 845). Stein and Wang (1988) argue that, in any type of program implementation such as parent/caregiver involvement, a teacher's commitment to or belief in its programming is a major influencing factor in its ongoing success. Thus, teachers' beliefs about their ability to work effectively with any representation of parent/caregiver is key, because "teachers who believe that parent/caregivers are capable of contributing to their children's educational success are more likely to secure parent/caregivers' involvement than those holding less positive views (Hoover-Dempsey, et al., 2002). In essence, "self-efficacy beliefs can therefore become self-fulfilling prophesies, validating beliefs either of capability or of incapacity" for teachers (Stacer & Perrucci, 2013, p. 342; Tschannen-Moran & Hoy, 2007, p. 945).

The significance of all of these barriers between teachers and parent/caregivers is in how they affect children. When educators and parent/caregivers do not develop positive relationships, the resulting dynamic affects how a child functions at school. Thijs and Eilbracht (2012) find that interactions between parent/caregivers and teachers affect the quality of student-teacher relationships to the extent that, the more positive the relationship, the more willing a parent/caregiver might be to disclose significant information regarding a student's strengths and needs (p. 795). Conversely, if the parent/caregiver and teacher do not have a positive

relationship, parent/caregivers may never share helpful child-specific information with teachers, potentially limiting the teacher's understanding of the child. Therefore, it is important to note that the child's experience at school is not just a neutral position in the relationship between a parent/caregiver and teachers. The positive parent/caregiver-teacher relationship establishes the ultimate best-case scenario for a student's educational experience. These examples further reinforce the notion that schools must make concerted efforts to educate their staffs in order to implement effective parent/caregiver involvement strategies. Developing a functional partnership between parent/caregivers and school personnel benefits the child, parent/caregiver, and teacher. It signals to children the value of education and gives them added support (Epstein & Lee, 1995, as cited in Izzo, et. al, 1999, p. 820). It also signals to parent/caregivers that they are valued. When parent/caregivers feel they are respected and become comfortable in the parent/caregiver-teacher partnership, "they put into practice the involvement strategies they already know are effective but have been hesitant to use" (National PTA, 2000, p. 16). As Rudney (2005) suggests, "When parent/caregivers and teachers successfully become a 'we', they can truly work as partners" (p. 46).

2.4 CHALLENGES FOR COMMUNITY SUPPORTS

Family-school-community partnerships in relationship to parent/caregiver involvement are an extension of support to children in their educational experience. The partnerships provide a more robust type of support that addresses the overall needs of children and families. Historically, beginning with colonial schools, parent/caregivers participated in all facets of a child's education, including school governance, curricular decision-making, teacher selection, and

support of religious teaching (Hiatt, 1994, as cited in Barge & Loges, 2003, p. 140). However, this changed in the early 1900s with the "bureaucratization of schools" and the expectations for greater professionalism from teachers, resulting in the evolution of parent/caregivers and teachers' roles into two separate spheres of influence (p. 140). The "community" portion of Epstein's overlapping spheres of influence is a reminder that linked supports are strongest. Similarly, when communities link federal, state, district, and school policies and work toward a common cause, programs are stronger (Epstein, 2010, p. 353). However, policies and enactments at each of these levels meet their own challenges concerning parent/caregiver involvement.

2.4.1 Federal influence

Several federal programs have supported family involvement for decades. According to Domina (2005), "their creation reflects the application of key insights from the sociology of education to the day-to-day operation of American schools" (p. 234). Head Start, the Elementary and Secondary Education Act (ESEA)/No Child Left Behind Act (NCLB)/Every Student Succeeds Act (ESSA), and the Individuals with Disabilities Education Act (IDEA) all have included requirements for home-school-community connections. However, as in the case of Title I, some services that intend to provide greater supports can sometimes cause unanticipated consequences. For example, Title I, Part A (Title I) of the Elementary and Secondary Education Act, (ESEA) "provides financial assistance to local educational agencies (LEAs) and schools with high numbers or high percentages of children from low-income families to help ensure that all children meet challenging state academic standards" (U.S. Department of Education, n.d.). The goal of this program is to provide a concerted focus of additional academic supports for traditionally underserved populations so that these students make academic gains at a similar rate

as their peers. However, the results of the implementation have not always been optimal. By singling out the low-income families whose students are supported by Title I, this program that was intended to support low-income families has "separated and segregated parent/caregivers within schools, limiting the sense of community and contradicting the concept of partnerships" (Epstein, 2010, p. 357). While unintentional, a program that requires partnerships with parent/caregivers further isolated parent/caregivers, in some instances, by its contrived nature.

This example leads to other challenges with federal guidelines. The intent of their language can be difficult to interpret, causing different schools to implement them differently. This vague language offers no assurance of quality programming, as in the example of Title I mandates for parent/caregiver involvement. Additionally, there are no serious consequences for states, districts, and schools who fail to follow the federal guidelines (Epstein, 2010, p. 357). In short, without reinforcement of these guidelines at the state and local levels, these acts tend to support parent/caregiver involvement in theory more than in reality.

2.4.2 State influence

State policies for educational programs can strongly influence district leadership, local practice, and community support (Epstein, 2010, p. 304). In this light, state leaders must find the best ways to support the important relationships among family, school, and community.

State decisions on school choice, for example, affect whether or not parent/caregivers have the option to select schools that are culturally sensitive to their families or that interact with families in a manner that parent/caregivers prefer. As Epstein (2010) explains, "Important family and school connections start with the choice of or assignments to schools" (p. 305).

Another state challenge is how to link parent/caregiver involvement to teacher preparation programs. Historically, there has been very little emphasis on parent/caregiver involvement training or inclusion of parent/caregiver involvement in the standards (Gonzalez-DeHass & Willems, 2003, p. 95), and "despite federal policy on family involvement, there has a been a 'limited effect on state certification requirements'" (Shores, p. 9, as cited in Gonzalez-DeHass & Willems, 2003, p. 95).

2.4.3 Local influence

The local level of parent/caregiver involvement is where schools implement programs through federal and state supports. However, local implementation of such programs also faces challenges.

First, adequate funding can be a challenge. Epstein (1991) recommends minimum per-pupil expenditures by federal, state, and local governments in order to fund the "leadership, development, training, implementation, evaluation, and continuous improvement of programs of partnerships in states, districts, and schools" (p. 349). It is important to acknowledge the relative financial commitment required to fund parent/caregiver involvement programming, and to understand that funding can be a barrier to parent/caregiver involvement, even for leaders with the best of intentions. Funding for programming may fluctuate with changes in leadership; therefore, so may the financial resources necessary to provide adequate programming.

Another challenge to parent/caregiver involvement programming is in developing an effective framework through which to implement such programming. Without an effective framework in place, changes in personnel and budget cuts threaten to halt progress on

partnerships (Epstein, 2010, p. 361). Therefore, districts must develop systems that can withstand the dynamic nature of staffing and funding.

Schools must also remember not to emphasize parent/caregiver involvement and a child's education in isolation of other community influences. "People, programs, businesses, activities, facilities, policies, finances, and local norms, beliefs, and attitudes" are all resources that can enhance community involvement (Preston, 2013, p. 416). We cannot acknowledge unequal access to a child's education without also acknowledging unequal access to healthcare, employment, and safe and affordable housing (Gorski, 2014). Because school districts typically function in isolation of other location agencies, this concept of collaboration is foreign for most. However, in the spirit of Epstein's overlapping spheres of influence, schools must look to make inter-agency connections. For example, the No Child Left Behind Act introduced the 21st Century Community of Learners initiative in order to provide a comprehensive set of educational, welfare, health, and recreational services to children and families beyond the hours of the school day (Coleman, 2012, p. 33). The initiative's goal of establishing schools as community centers is to make it easier for children and families to have all their needs met in one setting, and to allow community professionals to work together to address their needs (p. 33). Former Secretary of Education Arne Duncan explains the need:

> The fact is that it takes more than a school to educate a student. It takes a city. It takes a community that can provide support from the parks department, health services, law enforcement, social services, after-school programs, nonprofits, businesses, and churches. (Coleman, 2012, p. 34)

Communities that work to establish such inter-agency connections face implementation challenges. Rural and urban schools seem to face different challenges regarding community involvement programming. Rural schools, due to size and limited enrollment, tend to have

limited culturally diverse events as well as limited diversity in vocational role models (Isernhagen, 2010, as cited in Preston, 2013, p. 419). They also tend to "lack the infrastructure and human resources needed in developing assorted school-community partnerships" (Minner & Hiles, 2005, as cited in Preston, 2013, p. 419). Urban schools, on the other hand, possess more diversity, yet fewer people attend community-sponsored events (p. 419). In addition, urban schools tend to face challenges due to their larger student enrollment, as there seems to be a less personalized approach to school-community partnerships (p. 420).

Preston (2013) adds that providing opportunities for students to create school-business partnerships, such as service-learning, community-based education, and school-community work experience, also creates a beneficial type of community involvement (p. 419). However, implementing such opportunities is also challenging because the community-of-learners approach can be difficult to coordinate.

Each individual community must take a unified approach to educating its children. The community must align the intentions of city government, schools, health services, businesses, and other institutions. This is no small feat. Secondly, challenges also exist for schools that serve as the hub for a community. For example, while after-school programs have become more common in communities, there is evidence that families that are more affluent are able to benefit more than low-income families due to transportation, admission fees, and membership dues, thus ostracizing the target population (Coleman, 2012, p. 33). While the community-of-learners concept is ideal in theory, its translation into practical application is not as realistic for communities.

2.5 TECHNOLOGY AS A CATALYST

This literature review began by pointing out the challenges for parent/caregiver involvement, especially when a child is struggling. However, by recognizing the challenges that exist from multiple perspectives, we can see that the problem is not a lack of willingness for the parties to work together. Rather, the parties are not always able to work well together. In the absence of one singular formula to resolve this issue, schools, families, and communities must develop plans that are "responsive to the needs and interests of all families" (Epstein, 2010, p. 24). Hagel and Brown (2008) note that schools send out information to parent/caregivers but often do not provide any method for a response. They suggest that schools should enable parent/caregivers to have access to information and to communicate with the school when necessary. The most recent parent/caregiver involvement research shows how the use of technology is providing this path.

Parent/caregiver-teacher communication, a major component to parent/caregiver involvement, is dramatically changing because of "computer-mediated communication" (Thompson & Mazer, 2012, p. 132). Parent/caregiver-teacher communication previously required pre-scheduled phone calls or face-to-face conferences. These communication methods have transformed to daily communication using email, school-centered communication portals, or cell phone messaging. Parent/caregivers receive notifications of teacher communication virtually and immediately through technology. They can check their children's grades and send messages to teachers when it is convenient for them to do so. Technology seems to offer more efficiency to the communication process while also providing effective communication. As the aforementioned examples illustrate, there are several reasons that today's technology is positively affecting parent/caregiver-teacher communications. One is that communication can be asynchronous (Thompson & Mazer, 2012, p. 132), another is its convenience (Thompson, Mazer

& Grady, 2015, p. 190; Ho, Hung, & Chen, 2013), and yet another is the "processability" of the information being communicated (Robert & Dennis, 2005; Thompson, Mazer & Grady, 2015, p. 189).

As described earlier, one challenge with the parent/caregiver involvement process is a parent/caregiver's lack of time to commit to their children's school experiences (Strauss, 2013; Williams & Sanchez, 2011). The asynchronous nature of communication through technology can alleviate this challenge (Thompson & Mazer, 2012, p. 132). It allows for parent/caregivers and teachers to communicate when each party is able to do so. Simultaneous availability is not necessary in order for communication to be effective. The literature "praises parent[/caregiver]-teacher email communication as a parent[/caregiver] involvement panacea" due to asynchronous communication (Thompson & Mazer, 2012, p. 132).

Electronic communication also provides convenience. In a study conducted by Ho, Hung and Chen (2013), teachers communicated favorably about the level of ease and usefulness that technology provides. Similarly, parent/caregivers noted that the convenience of emailing was the reason they prefer this method of communication. Likewise, Thompson, Mazer and Grady's (2015) survey of over 1,000 parent/caregivers reveals that parent/caregivers prefer email communication to face-to-face or phone communication due to its convenience.

One might assume that shifting parent/caregiver-teacher communications to an electronic mode creates a less desirable way for the two parties to interact. While there are still topics that parent/caregivers prefer to discuss through face-to-face or over-the-phone conversations, data from studies like those of Thompson, Mazer and Grady (2015), Ho, Hung and Chen (2013), and Robert and Dennis (2015) show that parent/caregivers and teachers have minimized the necessity

of the “live” conversation as compared to the “convenience and quick response time” of electronic communication (Robert & Dennis, 2015, p. 197).

Another benefit of electronic communication is that it gives the reader the ability to process the information before being required to respond to the sender (Robert & Dennis, 2015, p. 15). Robert and Dennis (2015) explain that when one faces a potentially complex message, he or she will react in one of three ways: reject the message, look for other cues to determine how to respond, or table the message (p. 15). Therefore, in a situation in which parent/caregivers and teachers interact, taking additional time to process the content may allow for a more productive exchange between parties.

2.6 SUMMARY

Parent/caregiver involvement to support student success is a complex topic. The parent/caregiver, school, and community entities face multiple barriers as each group works to support students. Every parent/caregiver owns a unique story of how they are able to support their children; schools see varying levels of success when they adopt programs that were not specifically made for their sites; and the goals of policy, when enacted, do not always meet the mark of their good intentions.

In a technology-driven society such as ours, the parent/caregiver-teacher communication process is made easier through electronic communications. There is potential to increase involvement opportunities for parent/caregivers using technology-based tools. Thus, electronic communications as a catalyst for parent/caregiver involvement is a worthy topic to explore.

3.0 APPLIED INQUIRY PLAN

3.1 INQUIRY SETTING

3.1.1 Specific site or organization

The research site is a school district in Western Pennsylvania consisting of approximately 2,100 students. The district currently utilizes varying methods for parent/caregiver communications, including multiple types of electronic communication. The district is working to develop ways to communicate that will consider each parent/caregiver's unique needs in order to support school involvement.

3.1.2 Stakeholder demographics and key characteristics

The district consists of approximately 165 students per grade level, with the following approximate demographics: 83.5 percent Caucasian, 7.9 percent African-American, 5.1 percent multi-racial, 2.7 percent Asian, and less than 1 percent Hispanic/Latino, Pacific Islander and American Indian; approximately 25 percent low-income based on free/reduced lunch eligibility; 16 percent special education; and less than 1 percent English language learner. All of the buildings in the district experience inconsistency in parent/caregiver involvement. The district

wishes to explore how school communication methods, specifically electronic communications, affect parent/caregivers' involvement in their children's school experiences.

3.2 INQUIRY APPROACH

My research focuses on communication practices between teachers and parent/caregivers, specifically with electronic communications. Interviews and surveys explored which modes of electronic communication teachers use, which communication practices parent/caregivers prefer, and when parent/caregivers and teachers believe technology is an appropriate method of communication. This data identified effective communication practices for this particular district. Parent/caregivers and teachers of the third-grade students were the population for this study.

First, I interviewed the seven third-grade teachers (see Appendix D) to inquire about their current practices in parent/caregiver communication. I also asked about other forms of communication teachers use, as well as where they see electronic communications supporting parent/caregiver involvement.

Next, each of the seven homeroom teachers identified one parent/caregiver with whom he or she had two-way communication multiple times over the course of the first semester. The teachers also identified one parent/caregiver with whom they had minimal two-way communication. I interviewed these 14 parent/caregivers (see Appendix B). Interview questions explored parent/caregivers' definitions of involvement and how electronic communications supports parent/caregiver involvement in schools.

Finally, I asked the 160 parent/caregivers of third-graders and the seven third-grade teachers to complete a survey about their beliefs regarding parent/caregiver involvement, as well

as their beliefs regarding when and how electronic communications should be used. The modified surveys originated from a study by Dr. Christine Olmstead (2011). Olmstead explored whether parent/caregivers would be interested in using technological communications if their district implemented such options. I adjusted her survey questions to apply to the current district, which already utilized technological communications. I also refined the questions in response to teacher interviews in order to provide accurate examples of how the district and the teachers use electronic communications. (See Appendices A and C, respectively.)

Table 1. Applied Inquiry Plan aligns research questions with research methodology and explains the data analysis

RESEARCH QUESTIONS	METHODOLOGY
1. How do parent/caregivers and teachers define parent/caregiver involvement?	Parent/caregiver Interview questions 3-5 Teacher Interview questions 3,4 Parent/caregiver Survey questions 1,2 Teacher Survey questions 1,2
2. What do parent/caregivers and teachers define as barriers to parent/caregiver involvement?	Parent/caregiver Survey question 3 Teacher Survey question 3
3. How is technology used for parent/caregiver communications in the district?	Parent/caregiver Interview questions 3,5 Teacher Interview questions 1-3 Parent/caregiver Survey questions 4-8,10-18 Teacher Survey questions 4,6-11
4. Do parent/caregivers and teachers view the use of technology as a communications method that promotes parent/caregiver involvement?	Parent/caregiver Survey questions 9,20-24 Teacher Survey questions 11,13-15 Parent/caregiver Interview questions 5,6 Teacher Interview question 4

Table 1 continued

DATA ANALYSIS- INTERVIEWS	DATA ANALYSIS- SURVEYS
This study will use interview questions to collect both qualitative and quantitative data. Quantitative data was coded for specific themes that inform how the school approaches communication with its parent/caregivers. With a small sample size of 14 parent/caregivers and 7 teachers, the PI will look for trends in the quantitative data as well as conducting a rigorous statistical analysis.	I approached this study with a goal to explore the data looking at all the correlations to see which are useful for improving parent/caregiver-teacher communications in my district. More specifically, I looked at the following: 1. Frequency and percentages calculation provide a general understanding of how parent/caregivers and teachers responded to the content of the survey. 2. I looked for patterns within ordinal data collected through the items rated in the Likert-type scales. This was valuable for comparing the importance scores between parent/caregivers and teachers that focused on parent/caregivers' definition of parent/caregiver involvement and barriers to parent/caregiver involvement (survey questions 1, 2 & 3). 3. For teacher and parent/caregiver comparisons, I recognize that this is a very unbalanced design –- with a large *n* for parent/caregiver survey and small *n* for teacher survey. However, I compared answers to the same questions for the two groups to learn more about how the district might need to better align our practices. Two examples are to compare parent/caregivers' and teachers' beliefs regarding when technology should be used for communication (question 19 on parent/caregiver survey, question 13 on teacher survey); and to compare parent/caregivers' and teachers' opinions regarding whether technology positively influences parent/caregiver involvement (question 21 on parent/caregiver survey and question 15 on teacher survey). 4. I compared parent/caregivers' use of district communication portals and their preferred method of communication with teachers (parent/caregiver survey questions 6-10) with the same parent/caregivers' beliefs about how important the use of technology is to them, and how connected they feel to the school (parent/caregiver survey questions 20-22). I looked for associations or patterns in parent/caregivers' answers using the Kendall's Tau correlation. The Likelihood Ratio tests, Score tests, and Wald tests calculated the significance of the overall models. The Wald's Chi-Square tests calculated the significance of individual variables.

4.0 DATA ANALYSIS

The purpose of this inquiry was to explore how school communication methods, specifically electronic communications, affect parent/caregivers' involvement in their children's school experiences.

4.1 SURVEYS AND INTERVIEWS

Parent/caregivers of the 160 third-grade students received paper surveys via their children's homework folders. Parent/caregivers also received a link to the online version of the survey. One hundred out of 160 parent/caregivers of third graders responded to the parent/caregiver survey for a response rate of 62.5 percent. Parent/caregivers were able to skip questions; therefore, not every survey received 100 responses. Ninety-eight out of 100 parent/caregivers identified their gender; 88 were female and 10 were male. See Tables 2 and 3, respectively, for age distribution and ethnicity of the respondents. Overall, the ethnic representation of the parent/caregiver respondents was similar to the ethnicity district-wide.

Table 2. Parent/caregiver survey respondents' ages by range

Age range	*%*	*n count*
20-29	7%	7
30-39	57%	55
40-49	31%	30
50-59	5%	5
Total	100%	97

Table 3. Parent/caregiver survey respondents' ethnicity

Answer	*%*	*n count*
Hispanic/Latino	0%	0
African American	4.08%	4
Caucasian	92.86%	91
Native American	1.02%	1
Asian/Pacific Island	1.02%	1
Other: African American and Native American	1.02%	1
Total	100%	98

All seven third-grade teachers completed the teacher survey. Minimal demographic information is provided due to the small number of teachers involved. Five of the teachers were female, and two were male. Teachers' years of experience ranged from five years to 16 years. The same seven teachers who participated in the survey also participated in individual interviews.

Fourteen parent/caregivers, two from each of the seven third-grade classrooms, agreed to an interview. Thirteen were female and one was male. Each third-grade teacher recommended two parent/caregivers, naming one parent/caregiver with whom the teacher had ongoing contact, and one parent/caregiver with whom the teacher had little contact. Reasons for each parent/caregiver's selection varied. Some teachers had ongoing communication with a

parent/caregiver because a child was struggling academically; others remained in constant contact with parent/caregivers due to the parent/caregiver volunteering in the classroom. The rationale for selecting parent/caregivers with whom teachers had little communication was similar among teachers: In most cases, the teacher had been unable to develop an ongoing routine of interactive communication, despite multiple attempts. Reasons for maintaining minimal contact varied from the parent/caregivers' perspectives. Parent/caregivers' explanations are provided to acknowledge that their examples, or similar examples, may represent a larger representation of the parent/caregiver population. Several parent/caregivers explained that they maintained minimal contact with the teacher because they had no concerns about their children's performance in school; one parent/caregiver noted a busy work schedule; one parent/caregiver explained that she had a learning disability, making interaction with the teacher difficult; and another said that she found it difficult to interact with her child's teacher. Beyond these explanations, these parent/caregivers also stated that they were content with the amount of contact they have with their children's school. Finally, three of the parent/caregivers whom teachers identified as having minimal contact were unwilling to participate in an interview. Additional names were requested from teachers when this occurred in order to ensure feedback from two parent/caregivers per homeroom.

4.1.1 Research Question #1: How do parent/caregivers and teachers define parent/caregiver involvement?

The first two survey questions focused on how parent/caregivers and teachers define parent/caregiver involvement. Parent/caregivers and teachers were given 15 parent/caregiver-involvement activities and were asked to apply a value or importance level to them. The

majority of parent/caregivers and teachers agreed that the first six types of the parent/caregiver-involvement activities in school were valuable. Ninety percent or more of the parent/caregivers and all of the teachers agreed that *volunteering at school*, *chaperoning field trips*, *donating items to the classroom*, and *attending Open House* possessed some level of value (Either "Very valuable," "Valuable," or "Somewhat valuable"). Fewer parent/caregivers and teachers rated *attending PTO meetings* and *participating in fundraisers* as valuable compared to the other activities. (See Table 4.)

Table 4. Parent/caregiver and teacher ratings of the value of parent/caregiver involvement activities

Activity	% Parent/caregivers: Very valuable/Valuable/Somewhat valuable ratings	Teachers: Very valuable/Valuable/Somewhat valuable ratings
Volunteering at school	92% (*n*=91)	100% (*n*=7)
Chaperoning field trips	91% (*n*=90)	100% (*n*=7)
Donating items to the classroom	98% (*n*=97)	100% (*n*=7)
Attending Open House	98% (*n*=97)	100% (*n*=7)
Attending PTO meetings	72% (*n*=71)	71% (*n*=5)

Similarly, parent/caregivers and teachers agreed that the next nine parent/caregiver-involvements activities possessed at least some level of importance. While *participating in fundraisers* received the lowest importance rating from both parent/caregivers and teachers, the overwhelming majority of both parties rated all other activities as important to the parent/caregiver involvement process. (See Table 5.)

Table 5. Parent/caregiver and teacher ratings of the importance of parent/caregiver involvement activities

Activity	% Parent/caregivers: Very Important/Important/ Somewhat Important ratings	% Teachers: Very Important/Important/ Somewhat Important ratings
Participating in fund raisers	78% (*n*=77)	86% (*n*=6)
Communicating with my child's teacher	98% (*n*=98)	100% (*n*=7)
Asking my child about his/her school day	99% (*n*=99)	100% (*n*=7)
Checking my child's homework	96% (*n*=96)	100% (*n*=7)
Reading with my child or encouraging my child to read	100% (*n*=100)	100% (*n*=7)
Helping my child when he/she has questions about assignments	99% (*n*=99)	100% (*n*=7)
Checking my child's backpack	97% (*n*=97)	100% (*n*=7)
Following my child's progress	99% (*n*=99)	100% (*n*=7)
Staying informed about school events	92% (*n*=92)	100% (*n*=7)
Providing children with experiences (e.g. vacations, visits to museums, zoo)	90% (*n*=90)	100% (*n*=6)

The parent/caregiver and teacher interview questions addressed the same 15 parent/caregiver involvement activities as the survey. However, instead of rating their value or importance level, the participants were asked to identify what types of parent/caregiver involvement they believe electronic communication supports. The majority of teachers and

parent/caregivers felt that all examples of parent/caregiver involvement are supported by technology. Therefore, rather than provide the itemized data of parent/caregivers and teachers' responses, it seems appropriate, instead, to highlight a common theme that emerged through the responses. Even when parent/caregivers and teachers answered "No" to a given example, they were open to considering how the use of technology might support communications. For example, as teachers were asked if they felt that technology supported parent/caregivers in "Providing children with experiences," a common teacher response was, "No, but I really should consider doing so, shouldn't I?" Parent/caregiver responses, as well, showed a similar vein of willingness. One parent/caregiver responded that technology had not been used to support "Donating items to the classroom," but she was open to considering how it might. She explained, "We haven't used it in that way, but I'm sure it could be." Thus, both parent/caregivers and teachers, when given the specific lists of activities, were interested in considering how technology might provide ease to the given activity.

4.1.2 Research Question #2: What do parent/caregivers and teachers define as barriers to parent/caregiver involvement?

The survey asked parent/caregivers and teachers to rate how strongly they agree or disagree with seven different potential barriers to parent/caregiver involvement. The majority of parent/caregivers communicated that five of the seven statements listed were not barriers for them. (See Table 6.) The two areas that emerged as barriers were *I don't have time due to work or family needs* and *I think it's the school's job to educate my child*.

Table 6. Parent/caregiver ratings of barriers to parent/caregiver involvement

Barriers	Strongly agree; Agree; Agree just a little	Disagree; Strongly disagree	Total parent/caregivers
I don't speak or understand English	6% (*n*=6)	94% (*n*=93)	99
I don't have time due to work or family needs	50% (*n*=50)	50% (*n*=50)	100
I don't know how to help my child	15% (*n*=15)	85% (*n*=85)	100
I think it's the school's job to educate my child	59% (*n*=57)	41% (*n*=40)	97
I am not comfortable talking with my child's teacher	5% (*n*=5)	95% (*n*=95)	100
I do not feel welcomed at the school	7% (*n*=7)	93% (*n*=92)	99
I do not know how to get involved	8% (*n*=8)	92% (*n*=90)	98

Teachers' responses varied from the parent/caregivers' responses. (See Table 7.) While parent/caregivers noted that the majority of statements were not barriers for them, the teachers felt that the majority of statements did, in fact, cause barriers to parent/caregiver involvement for parent/caregivers. There were only two questions that the majority of teachers (*n*=2) did not identify as barriers. They were *Parent/caregiver does not feel welcomed at the school* and *Parent/caregiver does not know how to get involved.*

Table 7. Teacher ratings of barriers to parent/caregiver involvement activities

Barriers	Strongly agree; Agree; Agree just a little	Disagree; Strongly disagree	Total teachers
Parent/caregiver does not speak or understand English	57% (*n*=4)	43% (*n*=3)	7

Table 7 continued

Parent/caregiver does not have time due to work or family needs	100% (*n*=7)	0%	7
Parent/caregiver does not know how to help my child	100% (*n*=7)	0%	7
Parent/caregiver thinks it's the school's job to educate my child	86% (*n*=6)	14% (*n*=1)	7
Parent/caregiver is not comfortable talking to their child's teacher	57% (*n*=4)	43% (*n*=3)	7
Parent/caregiver does not feel welcomed at the school	29% (*n*=2)	71% (*n*=5)	7
Parent/caregiver does not know how to get involved	29% (*n*=2)	71% (*n*=5)	7

In comparing parent/caregivers and teachers' perspectives, two categories aligned as stronger barriers than others. The first is *I don't have time due to work or family needs*. Fifty percent (*n*=50) of parent/caregivers and 100 percent (*n*=7) of teachers agreed to some degree with this statement. The second barrier was *I think it's the school's job to educate my chil*d 59 percent (*n*=57) of the parent/caregivers and 86 percent of teachers (*n*=6) agreed at some level that this is a barrier.

4.1.3 Barriers as presented in the literature review

We can look at the barriers to parent/caregiver involvement not only through the lens of the activities or beliefs listed above. We can also explore the data through the lens of the overarching demographic barriers identified in the literature review. The barriers that also have data points in the survey were socioeconomic status, race, and language. The purpose of exploring these areas is to determine whether the data can inform specific challenges present for these groups in this particular district. Considering that these demographic groups tend to find more barriers to parent/caregiver involvement, based on the literature, I determined that cross-referencing the final question of the survey would provide the most meaning for the district. Essentially, Table 8 addresses the following question: For the three groups that tend to face more barriers in parent/caregiver involvement, how connected do these parent/caregivers feel? The data presented in the table show how the varying demographics relate to parent/caregivers' feelings of connectedness. I further explore parent/caregivers' feelings of connectedness when I present data for research question #4, "Do parent/caregivers and teachers view the use of technology as a communications method that promotes parent/caregiver involvement?"

Table 8. Parent/caregivers' feelings of connectedness based on demographics that typically act as barriers

Demographic	Very connected	Connected	Neutral	Somewhat Disconnected	Very Disconnected
Socioeconomic status (*n*=22)	32% (*n*=7)	50% (*n*=11)	9% (*n*=2)	4.5% (*n*=1)	4.5% (*n*=1)
Race (*n*=7)	43% (*n*=3)	14% (*n*=1)	29% (*n*=2)	14% (*n*=1)	0% (*n*=0)
Language (*n*=6)	50% (*n*=3)	16.6% (*n*=1)	16.6% (*n*=1)	16.6% (*n*=1)	0% (*n*=0)

Based upon parent/caregivers' responses, 25 percent (*n*=22) of the 87 parent/caregivers who identified their income level in the survey can be considered low-income. According to the National Center for Children in Poverty (n.d.), an income of just under $50,000 for a family of four is considered low income. Another important statistic the survey revealed is that 100 percent (*n*=100) of the parent/caregivers own phones. In addition, while 25 percent of the parent/caregiver respondents are considered low-income, 82 percent (n=18) of those parent/caregivers reported feeling connected to the school.

Another area the literature review discussed is race as a barrier. Seven of 98 parent/caregivers in the survey identified their race as African-American, Native American, Asian/Pacific Islander, or multi-racial. Fifty-seven percent (*n*=4) of the parent/caregivers reported feeling *Very connected* or *Connected* to the school.

A final area, language, did not render clear results. Six out of 99 respondents said that they do not speak or understand English in the parent/caregiver survey. However, nearly all 100 respondents answered all survey questions. It is unclear as to why this inconsistency exists. Regardless, approximately 67 percent of the parent/caregivers who said that they do not speak or understand English stated they felt *Very connected* or *Connected* to the school.

4.1.4 Research Question #3: How is technology used for parent/caregiver communications in the district?

Technology is being used in many forms in the district. With 98 percent (*n*=98) of parent/caregivers reporting that they have internet access and 100 percent (parent/caregiver *n*=100; teacher *n*=7) of parent/caregivers and teachers reporting that they own a cell phone, parent/caregivers and teachers reported using technology in many ways to interact with school

information. Ninety-six percent (*n*=95) of parent/caregivers stated that the district's use of technology as a means for communication had some level of importance. Similarly, 100 percent of teachers (*n*=7) agreed that it is "Very Important."

Teachers and parent/caregivers defined the multiple technological methods they use to communicate with one another. Data shows that the majority of parent/caregivers prefer using email and/or the teacher's communication portal to facilitate communication. Parent/caregivers rely on the gradebook portal for ongoing grade updates. However, some parent/caregivers use the district website; most parent/caregivers, though, do not rely upon it as much as the technology that allows for interaction with the teacher. The parent/caregivers' current use of district technology is as follows: 82 percent (*n*=82) of parent/caregivers access the district website at least one to two times per month, 58 percent (*n*=58) check the online grade book portal at least one to two times month, and 91 percent (*n*=91) check the classroom communication portal at least one to two times per month, with 53 percent (*n*=53) of the parent/caregivers reporting that they check it daily. (See Table 9.)

Table 9. Parent/caregivers' frequency of use of the district's technology-based communication portals

Portals	Daily	1-2 times per week	1-2 times per month	Never	Total
District website	6% (*n*=6)	17% (*n*=17)	59% (*n*=59)	18 (*n*=18)	100
Online grading portal	13 (*n*=13)	31% (*n*=31)	14% (*n*=14)	42 (*n*=42)	100
Teacher's communication portal	53 (*n*=53)	26% (*n*=26)	12% (*n*=12)	9% (*n*=9)	100

In addition, 73 percent (*n*=73) of parent/caregivers reported that they have exchanged messages with their children's teachers by using the classroom communication portal, 46 percent

(*n*=18) of the respondents who have been given teachers' cell phone numbers have exchanged text messages, and 66 percent (*n*=65) say they have exchanged emails.

While the methods may vary, parent/caregivers and teachers reported through both surveys and interviews that they use technology for communicating about academics, behavior, homework, volunteering, school events, student absence, health, and personal information. Academics and homework were the two most prevalent responses in the survey. (See Table 10.)

Table 10. Topics discussed between parent/caregivers and teachers through electronic communications

Topics discussed through electronic communication	Parent/caregivers	Teachers
Academics	32% (*n*=77)	100% (*n*=7)
Behavior	16% (*n*=39)	100% (*n*=7)
Homework	22% (*n*=53)	100% (*n*=7)
School events	11% (*n*=27)	71% (*n*=5)
Volunteering	11% (*n*=27)	100% (*n*=7)

One hundred percent (*n*=7) of the teachers reported communicating about *academics*, *behavior*, *homework*, and *volunteering*, with 71 percent (*n*=5) also adding *school events* to the list.

Despite the high level of technology use for communication purposes, 77 percent (*n*=76) of parent/caregivers and 100 percent (*n*=7) of teachers communicated that they believe certain communications should take place through a live conversation rather than through technology. Sixty percent (*n*=65) of parent/caregivers identified *behavior* as a topic that should be left for live conversations, while 24 percent (*n*=26) identified *academi*cs. Similarly, 43 percent (*n*=3) of teachers identified *behavior*, and 29 percent (*n*=2) identified *academics*. The remaining parent/caregivers and teachers responded that *behavior* or *academics*, or noted that any *topics of concern*, merit a live conversation.

Parent/caregivers responded favorably to the district's overall communication processes with parent/caregivers. The 14 parent/caregivers who were interviewed were asked to rate the district on a scale of one to five, in which one is the lowest score for communication processes and five is the highest. Eleven parent/caregivers rated the district a *five*, and three parent/caregivers rated the district a *four*.

4.1.5 Research Question #4: Do parent/caregivers and teachers view the use of technology as a communications method that promotes parent/caregiver involvement?

Parent/caregivers and teachers who were interviewed were asked if they believe technology supports parent/caregiver involvement. Thirteen parent/caregivers stated they believe it does, while one parent/caregiver stated that her level of involvement remains the same whether or not technology is used. All seven teachers believed that technology supports parent/caregiver involvement.

When parent/caregivers and teachers identified the advantages and disadvantages of communicating through technology, several themes emerged. The most frequent advantage named was *efficiency* (*n* parent/caregivers=11, *n* teachers=6*)*. Parent/caregivers and teachers appreciate the *quick response time* and how a quick response can often prevent small issues from escalating into bigger issues (*n* parent/caregivers=1, *n* teachers=3*)*. Parent/caregivers noted that they are more inclined to check their children's school information because it is so readily available. They appreciate that it is at their fingertips when they are available to check it. Both parent/caregivers and teachers also reported other advantages. The *asynchronous nature* of communication through technology (*n* parent/caregivers=2, *n* teachers=2*)* and *seeing actual footage* of their children's educational experiences through pictures and videos (*n*

parent/caregivers=4, *n* teachers=5*)* were themes that emerged. They described how the videos and pictures posted by teachers help them to gain a more accurate picture of what their children's school experiences truly look like. Parent/caregivers (n=2) also noted that the additional information from teachers *sparks conversations at home* with their children at the end of the school day – that it opens the lines of communication with their children because they know more specifically what to ask their child about their day. They also noted that communication through technology provides time to *think before speaking* (*n*=1). In addition, parent/caregivers noted that using the school technology portals eases the management of schoolwork and activities when they have multiple school-age children.

The disadvantages of electronic communication as stated by parent/caregivers and teachers varied, but two common themes emerged. The most common potential disadvantage noted was that this form of communication is difficult for those with *no access to technology* or who *struggle using technology* (*n* parent/caregivers=4, *n* teachers=1). Parent/caregivers and teachers also noted that this form of communication *lacks personality* and *can easily be misconstrued* (*n* parent/caregivers=4, *n* teachers=2). They also identified several other disadvantages. Given the small sample of parent/caregivers and teachers interviewed, it seems appropriate to provide the responses. The other noted disadvantages included the following: electronic communication makes it *too easy to reply before thinking* when upset (*n* parent/caregiver=1); it *doesn't foster independence in the child* when the child knows the parent/caregiver receives a nightly homework message (*n* parent/caregiver=1); it is *difficult for someone with a learning disability* (*n* parent/caregiver=1); *cyber security* is a concern *(n* parent/caregiver=1); the parent/caregiver becomes *obsessed* with checking the technology or

with the information provided (*n* parent/caregiver=1); and some parent/caregivers just *don't want to have one more location to check for messages* from school (*n* teacher=1).

In addition to interview responses, several survey questions align with this research question. The first, asked of both parent/caregivers and parents, is "What is your preferred method of communication?" Seventy-nine percent (*n*=79) of parent/caregivers named a technology-based method of communication, or a combination of methods where at least one form involved technology. An additional 9 percent (*n*=9) of the parent/caregivers answered that they prefer using a phone to communicate with teachers. It is unclear whether their preference was for using phones as a technology option or as a mode to engage in a live conversation. Eighty-six percent (*n*=6) of teachers named a method that was technology-based. The final teacher identified *phone* as his/her preferred method. Again, it is unclear whether the teacher was implying that the use of the phone was for a live phone conversation or if it was for email, texting, or communicating via a communication portal.

The next survey question that aligns is, "Do you believe that the use of technology for parent/caregiver-teacher communications positively influences a parent/caregiver's ability to stay involved in their children's education?" Ninety-two percent (*n*=92) of the parent/caregivers either "Strongly agree" or "Agree" with this statement, with 6 percent (*n*=6) answering "Neutral" and 1 percent (*n*=1) answering "Strongly disagree". (See Table 11.) One hundred percent of teachers (*n*=7) answered either "Strongly agree" (n=5) or "Agree" (n=2).

Table 11. Parent/caregivers' beliefs of whether technology positively influences parent/caregiver involvement

Parent/caregivers' beliefs on whether technology positively influences parent/caregiver involvement	*%*	*n count*
Strongly Agree	67%	66
Agree	26%	26
Neutral	6%	6
Disagree	0%	0
Strongly Disagree	1%	1

The final parent/caregiver survey question related to this research question asked parent/caregivers to rate how connected they feel to their children's school and staff. The term "connectedness" in parent/caregiver involvement refers to the comfort level parent/caregivers develop with teachers and staff in their children's school. The goal of introducing the idea of connectedness relates back to Hoover-Dempsey and Sandler's (1997) "patterns of influence" (p. 3). As previously described, the process of parent/caregivers choosing their involvement level in their children's schooling begins with feeling comfortable (U.S. Department of Education, 2004, as cited in Guerra & Nelson, 2013, p. 424). Once they find comfort and success with their efforts, they begin to develop a relationship with, or a connection to, the school. If a similar number of parent/caregivers that report using the district's technology also report feeling connected to their children's schools, it may be appropriate to assert that the use of technology helps parent/caregivers in their journey to build or maintain a relationship with the school. With that being said, 67 percent (n=67) of parent/caregivers who reported that some technology is their preferred method of communication also reported feeling a level of connectedness to the school (either "Very Connected" or "Connected"). Overall results of all parent/caregivers' feelings of connectedness are listed below, showing that 86 percent of the parent/caregivers feel "Very connected" or "Connected" with the school. (See Table 12.)

Table 12. Parent/caregivers' rating of their feelings of connectedness to school and staff

Parent/caregivers' feeling of connectedness	*%*	*n count*
Very connected	46%	45
Connected	40%	39
Neutral	11%	11
Disconnected	3%	3
Very Disconnected	1%	1

In addition to the summary of data, associations between pairs of variables were explored among several questions. Comparisons were made to determine if any correlations or associations exist between parent/caregivers' use of the different technology portals and how much parent/caregivers feel that technology influences their involvement experiences. In order to measure the association between ordered variables, the Kendall's Tau Correlation was used. Kendall's Tau has also been shown to work when one or both of the variables are binary. Since question 10 is a binary variable, Kendall's Tau was also calculated when question 10 is one of the variables. Heuristically, 0.3 is considered a lower cutoff for moderate correlation. Three correlations were above this threshold.

There was a moderate correlation between question 7 and question 22, question 8 and question 22, and question 10 and question 22 (see Table 13). As parent/caregivers used the online grade book more (question 7), they tended to feel more connected (question 22); as parent/caregivers used the communication portal more (question 8), they tended to feel more connected (question 22); parent/caregivers who exchanged messages through the portal (question 10) tended to feel more connected (question 22). (See Table 13).

Table 13. Kendall's Tau Correlation to measure the association between survey questions

Survey question:	Associated with:	Kendall's Tau Correlation
Question 7: How often do you check HSD's online grade book portal, Power school? (Response options: Daily; 1-2 times per week; 1-2 times per month; Never)	Question 22: The term "connectedness" in parent/caregiver involvement refers to the comfort level that a parent/caregiver develops with teachers and staff in their child's school. The higher the parent/caregiver's comfort level, the greater the trust and the greater the potential to work cooperatively on behalf of the child. Please rate how well connected you feel to your child's school. (Response options: Very connected; Connected; Neutral; Somewhat disconnected; Very disconnected)	0.335
Question 8: If your child's teacher uses a communication portal (such as Remind, Class Dojo, Google classroom, Seesaw, classroom website), how often do you check the portal for information? (Response options: Daily; 1-2 times per week; 1-2 times per month; Never; My child's teacher does not use a portal)	Question 22: The term "connectedness" in parent/caregiver involvement refers to the comfort level that a parent/caregiver develops with teachers and staff in their child's school. The higher the parent/caregiver's comfort level, the greater the trust and the greater the potential to work cooperatively on behalf of the child. Please rate how well connected you feel to your child's school. (Response options: Very connected; Connected; Neutral; Somewhat disconnected; Very disconnected)	0.474
Question 10: Have you exchanged messages using the communication portal your child's teacher uses? (such as Remind, Class Dojo, Google classroom, Seesaw, classroom website) (Response options: Yes; No)	Question 22: The term "connectedness" in parent/caregiver involvement refers to the comfort level that a parent/caregiver develops with teachers and staff in their child's school. The higher the parent/caregiver's comfort level, the greater the trust and the greater the potential to work cooperatively on behalf of the child. Please rate how well connected you feel to your child's school. (Response options: Very connected; Connected; Neutral; Somewhat disconnected; Very disconnected)	0.395

Furthermore, the p-values were calculated to test if these correlations indicate significant associations. Using the traditional significance level of 0.05 and noting any p-value below this

level, we see that the p-values indicate a significant association. (See Table 14.) It is important to note that a considerable number of raw unadjusted p-values were created in this data analysis. The p-values are reported keeping this qualification in mind.

Table 14. P-values for Kendall's Tau Correlation

	Question #7	Question #8	Question #10
Question #22	0.0001	1.572e-07	4.129e-05

In addition to the Kendall's Tau Correlation, other advanced data analysis was conducted. The Likelihood Ratio tests, Score tests, and Wald tests were run to test the significance of the overall models. The Wald's Chi-Square tests were run to test the significance of individual variables. (See Appendix M.)

Results of this further data analysis support the correlations found in the Kendall's Tau analysis. For example, the analyses found that as parent/caregivers feel more connected, they are more likely to say "Yes" that they have exchanged messages with their child's teacher via the teacher's communication portal, and more likely to say they check the district website, online grade book, and teacher communication portal more often.

Similarly, as parent/caregivers place more importance on communicating through technology, they are more likely to say "Yes" that they have exchanged messages with their child's teacher via the teacher's communication portal and more likely to check the communication portal. As they place more importance on technology communication, they are especially likely to check the portal more often.

5.0 DISCUSSION

Multiple themes emerged from the input provided by parent/caregivers and teachers. Both the surveys and personal interviews helped reveal how parent/caregivers and teachers view parent/caregiver involvement, as well as how technology is helping them as they work together to support children. The results also raise important questions. I will discuss the results by research question, and I will then discuss limitations, recommendations, and conclusions.

5.1 RESEARCH QUESTIONS

5.1.1 Research Question #1: How do parent/caregivers and teachers define parent/caregiver involvement?

Parent/caregivers and teachers' definitions and ratings of types of parent/caregiver involvement (see Tables 4 and 5) show that, regardless of its specific definition, parent/caregiver involvement, conceptually, is highly valued.

The parent/caregiver interviews revealed more details as to how the importance levels varied. For example, one parent/caregiver felt that volunteering in the classroom was the key activity that kept her connected, while another felt that the daily messages from the teacher were key. While parent/caregivers rated all of the parent/caregiver involvement examples as being

important to some degree, parent/caregivers' personal family situations clearly affected which activities took precedence over the others. Hoover-Dempsey and Sandler's (1997) model reminds us to acknowledge these outside factors when considering a parent/caregiver's potential involvement and effectiveness. In addition to recognizing the influence of home factors, the study also revealed that both parent/caregivers and teachers believe that technology can support parent/caregiver involvement. With both groups being open to using technology is this way, the district should explore how to apply these results. Herein lies the work for each district. Perhaps a parent/caregiver questionnaire at the start of each school year would help teachers identify what type of partnership might meet parent/caregiver preferences. Certainly, asking the parent/caregivers' opinions helps parent/caregivers to know that their beliefs matter, which supports Hoover-Dempsey and Sandler's (1997) philosophy within the patterns of influence.

Several questions remain regarding this research question. First, if teachers choose to seek parent/caregivers' feedback regarding involvement, how will this affect teachers? Will they be able to fulfill each parent/caregiver's desires while maintaining a primary focus on their students? Additionally, how do we consider the opinions of the parent/caregivers who did not respond to the survey in this study? Or, for any district, how do we consider the faction of parent/caregivers who are most difficult to engage? How can the teachers initiate their efforts in a way that entices the less-willing participants to try communication through technology? Hopefully, offering more efficient modes of communication will draw in a greater number of those hard-to-reach parent/caregivers. But knowing exactly how to begin the relationship remains a challenge.

This data regarding how parent/caregivers and teachers define parent/caregiver involvement reminds educators that there is not a singular approach for a parent/caregiver to be

effectively involved, nor should we expect there to be, with the variety of family situations that exist within each teacher's classroom. This data also provides a clear picture that both parent/caregivers and teachers value the involvement that occurs between home and school.

5.1.2 Research Question #2: What do parent/caregivers and teachers define as barriers to parent/caregiver involvement?

Interestingly, the parent/caregiver respondents identified fewer topics as potential barriers than did the teachers, revealing their belief that few areas prevent them from being involved. This perceived paradox between parent/caregiver and teacher responses actually shows great potential for partnerships. Parent/caregivers communicated that only two major areas cause barriers to parent/caregiver involvement (see Table 6), while the teachers considered nearly all of the topics listed as viable barriers for parent/caregivers (see Table 7). These responses show the ownership that both parties assume in the children's educational processes. Parent/caregivers are making few excuses for what gets in the way of their involvement, while teachers willingly acknowledge that parent/caregivers have multiple challenges that can interfere with being involved. This data is promising, as Epstein (1995) and others emphasize the significance of both parties working collaboratively for the benefit of children.

Another interesting set of responses include the three topics that teachers saw as being less significant barriers than others. The statements related to parent/caregivers' not feeling comfortable with teachers, not feeling welcomed at school, and not knowing how to get involved are three areas that teachers noted were less of an issue than the others were for parent/caregivers. Presumably, the teachers perceive themselves as effective and welcoming communicators, knowing the effort they put forth in these areas. However, because feedback

from parents regarding not feeling comfortable or welcome addresses the school as a whole, the school may wish to reflect collaboratively. Perhaps there are effective ways to communicate as an entire school population, in addition to within each individual classroom. Such collaboration can foster a greater sense of comfort, as well as help parent/caregivers more clearly understand how one might get involved.

In addition to considering the individual barriers listed in the survey, we can also consider barriers by looking through the lens of the demographic barriers presented in the literature review. Technology seems to relieve these barriers in several ways. Socioeconomic status was the first barrier identified. As the survey data reveals, parent/caregivers' income levels do not prohibit them from owning cell phones. Because the district technology is compatible with any smart phone, access to this technology does not seem to be a barrier for low-income parent/caregivers. Using phones as a tool through which parent/caregivers can connect to their children's schooling is a viable option, even for parent/caregivers with lower family incomes. The survey responses also show that the majority of the low-income parent/caregivers have positive feelings toward the school, as they reported feeling connected to the district. These positive feelings provide another example of how communication through technology may provide relief to a group that traditionally faces barriers to parent/caregiver involvement.

Two other barriers identified for parent/caregivers in the literature review include parent/caregivers' job responsibilities and family structure. These two topics seem to have some common characteristics. As previously explained, job responsibilities surfaced as a top barrier for parent/caregivers. However, this study also found that the efficiency of technology was a key factor in alleviating this barrier. It would seem that efficiency reduces the issues that arise with family structure. As stated in the literature review, single parent/caregivers are typically less

likely to gain the material rewards garnered by parent/caregivers who represent the more typical school involvement role due to time constraints that arise by a parent/caregiver raising a family alone (Lee & Bowen, 2006, p. 198). Hopefully, in the same way that technology can provide ease for parent/caregivers due to job responsibilities, its efficiency can also support parent/caregivers with varying family structures.

As compared to the other barriers mentioned in this study, race seems to have more of an impact on parent/caregivers' feelings toward the school than the other barriers. While most of the minority parent/caregivers feel connected to the district, just under half do not. The small sample of parent/caregivers makes it difficult to draw broader conclusion from the results, but it is important to note that the feelings of connectedness for this group of parent/caregivers had a wide range of responses. The district should consider seeking additional feedback from parent/caregivers of varying ethnicities to determine if new approaches to communication are necessary to strengthen relationships.

In addition to the barriers noted for parent/caregivers, several teacher barriers are reduced through technology, based upon the results of this study. First, the literature review noted that typical school communications could require parent/caregivers to meet in an intimidating setting on school turf (Gonzales-DeHass & Willems, 2003, p. 93). This presents a barrier for effective communication for both parent/caregivers and teachers, as the location makes the parent/caregivers feel uncomfortable, which is beyond the teacher's control. The use of technology for many school communications may help in this area. Technology-based communications can help parent/caregivers and teachers to initiate relationships from afar. This can establish a trusting relationship that may make future interactions in the school setting feel

more comfortable for the parent/caregiver. The use of technology, then, resolves more than just the challenge presented by meeting location.

Another challenge for teachers involved their perceptions of what defines an involved parent/caregiver. Malone (2015) notes that some parent/caregivers are interactive in the school setting, while others actively support their children in the home setting (p. 15). Teachers may think that those parent/caregivers whom they do not see in the school are not actively involved. While this perception may not be intentional, it can create a barrier between teachers and parent/caregivers. Technology-based involvement can provide teachers with evidence of a parent/caregiver's involvement, regardless of where this involvement takes place, helping them to see more clearly the variety of ways parent/caregivers can be active in their children's school experiences.

Teacher self-efficacy is another area supported by technology. Thijs and Eilbracht (2012) note that positive relationships impact how a child functions at school (p. 795). They also note that the more effective teachers feel in their efforts to involve parent/caregivers, the more positive that relationship is for parent/caregivers and teachers (p. 795). Thus, ease of communication supports building these relationships.

At the community level, one challenge to parent/caregiver involvement is funding. Fortunately, funding does not present itself as an issue when considering the technology discussed in this study. First, the district provides email access, as a cost allotted to maintaining the district website. Next, the current cost of the district's grade book application is approximately $27,000 (See Appendix N.) However, due to online parent/caregiver access being a current trend for school districts, this purchase was a feature included in the software package. Its support of parent/caregiver involvement provides an unanticipated bonus. Finally, the

communication portals currently used by teachers are free to the district; therefore, once again, there is no direct cost to the district to support teachers in using these portals. Even so, the school board of directors supports efficient communication processes between teachers and parent/caregivers, which is why they support the use of the grade book portal. Even if it only indirectly supports parent/caregiver involvement, the support is worth acknowledging.

While technology has the potential to relieve several persistent barriers, one must also consider whether any unintended new barriers might arise due to the use of technology. How will technology impact parent/caregivers of varying generations? Will its use versus previous traditional modes of communication impact older parent/caregivers' comfort levels? Another group to consider is the more transient population of families. How long does it take for a parent/caregiver to become accustomed to the use of a teacher's communication portal? Do varying portals from one district to the next add another stressor to the parent/caregiver whose family moves frequently?

Hoover-Dempsey and Sandler's (1997) patterns of influence emphasize that key events in parent/caregivers' experiences impact the role that they play in their children's academic careers (p. 8). Thijs and Eilbracht (2012) emphasize that teachers who feel more effective develop relationships that are more meaningful with parent/caregivers (p. 795). The use of technology can help parent/caregivers and teachers overcome the barriers they face so they can work together to support their children. This is not to say, however, that we will not face new challenges due to its use in the future. Districts should be attentive to parent/caregivers' feedback to determine how to address unanticipated concerns. Districts should also be excited to consider that technology can potentially enhance parent/caregiver communications. Hopefully, all

parent/caregivers will see that their voices are being heard and that they are valued by the teachers who are educating their children.

5.1.3 Research Question #3: How does the district use technology for parent/caregiver communications?

At this time, the district does not mandate the use of a specific type of technology to communicate with parent/caregivers. In fact, the district does not mandate in any way that teachers use technology for parent/caregiver communication. Feedback from parent/caregiver respondents suggests that the district use some form of technology as the main mode of daily communication. Parent/caregiver interviews also suggest that a uniform method of communication through technology would be helpful so that parent/caregivers do not have to learn to use differing applications from one year to the next. Another suggestion is that technology support should be offered to parent/caregivers at the start-of-year Open House so parent/caregivers can learn how to sign up for the online grade book and teacher-communication portal in a setting where support is available. Overall, nearly all parent/caregivers who responded rely on technology in some capacity to remain informed about their children's school experiences.

Similar to the previous research questions, several questions emerge regarding how technology can be used across the district. While this study focused on an elementary grade, can technology similarly support upper elementary, middle, and high school families? Parent/caregiver involvement traditionally lessens as students get older, so how can technology foster a connection for parent/caregivers of older students? Also, considering Epstein's (1995) overlapping spheres of influence, how can districts further include the community, not just

parent/caregivers and teachers, in its attempts to make connections through technology? Should districts use social media, a trendier form of technology communication, to reach outward? Where should the use of electronic communications begin and end in terms of the purpose it should serve for a district?

Technology can support districts as they reach out to families, as parent/caregivers and teachers both prefer its use for nearly all communications. It is up to each district to determine the purpose they wish technology to serve for their parent/caregivers and community.

5.1.4 Research Question #4: Do parent/caregivers and teachers view the use of technology as a communications method that promotes parent/caregiver involvement.

The surveys and interviews show that both parent/caregivers and teachers appreciate the use of technology for parent/caregiver-teacher communications. There is an association between parent/caregivers' use of the technology portals and their feelings about the district. The more parent/caregivers used the online grade book portal and teacher communication portal, the more connected they felt to the district; they were also more likely to place greater importance on communication through technology and to believe that technology positively influences parent/caregiver involvement. In the same way, parent/caregivers who exchanged messages with their children's teachers through technology felt more connected to the district, placed more importance on communication through technology, and believed that technology positively influences parent/caregiver involvement.

As the district considers further use of technology, or refining current uses, it should keep in mind that the frequent use of technology is resulting in more positive feelings toward the

school. The district should consider how to continue to allow for efficiency for both parent/caregivers and teachers, remembering that ease of use is a key to positive reviews.

Several questions emerge from this research question. If technology can offer opportunities for parent/caregivers from varying backgrounds to develop connections with their children's schools, how will the district work to uphold or maintain this relationship? Building a relationship requires the district to continue to be responsive to parent/caregivers. For example, what other school processes should be adjusted to maintain a relationship with a broader population of involved parent/caregivers? A greater use of technology also sparks another question: How will communication through technology affect the chain of command in schools regarding topics of concern? Will teachers be expected to address a broader set of topics due to the efficiency of technology and the direct link that parent/caregivers have with teachers? Will parent/caregivers use communication tools to exert too much influence on their children's school experiences? School leaders should establish clear protocol for electronic communication between staff and parent/caregivers.

Recognizing that efficiency is key to why technology renders positive feelings from parent/caregivers, this study also prompts questions about other ways in which efficiency might be applied to school practices. How can technology improve homework practices? How can it support children who require curricular modifications? Will the use of technology in these areas also foster positive feelings from parent/caregivers as it relates to their academic experiences with their children at home?

Finally, in regard to this particular district and this study, the data shows a correlation between parent/caregivers' use of technology and parent/caregivers' feelings of connectedness to their children's school. Is it the use of technology fostering that sense of connectedness? Or

would this particular group of respondents have remained involved and feeling connected regardless of the communication mechanism? Additionally, how do other identifying factors from this district affect the results? Further work with this topic can better define and refine exactly how technology can support parent/caregivers in their efforts to be involved with their children's schooling.

5.2 RECOMMENDATIONS

School districts should remember that virtually all parent/caregivers want their children to succeed in school (Lee & Bowen, 2006). Therefore, districts should keep in mind that parent/caregiver involvement may look different for each parent/caregiver based upon their beliefs, backgrounds, and daily life structures – but it is still parent/caregiver involvement. School districts should acknowledge that family variables affect what a parent/caregiver's involvement may look like, and should welcome all forms of involvement. For the district in this study, school leadership should consider setting minimum expectations for communication through technology, perhaps by noting the most preferred frequency identified in this study. While such expectations currently exist for the use of the grade book portal, they do not for parent/caregiver-teacher communications. This minimum communication standard, paired with expectations for personal contact, aligns with the needs and wishes the parent/caregivers voiced in this study. The district should consider requiring that all teachers use the same or similar communication platforms so there is ease in the transition from one year to next (and from one teacher to the next) and should consider regulating a minimum amount of use of the communication portal, as well as the topics addressed through it. For example, the district might

decide that all teachers should post homework assignments daily, should provide an overview of the upcoming week, and should provide personal feedback to parent/caregivers regarding their students at least once per month. At the start of each year, the district should also provide parent/caregivers with help to connect to the technology portals it uses.

Additionally, in light of the ways that technology has shown to have a positive impact in this particular district, other school districts should consider how the use of technology could foster parent/caregiver involvement in their own schools. While some results of this study may have the potential to apply to other settings, some may not. Therefore, districts should reflect on how they are currently using technology and should seek parent/caregivers' and teachers' input to determine what works best in their own setting. Districts should explore ways in which technology can bridge communications between home and school, but also should remember that both parent/caregivers and teachers still greatly value the power of a live conversation, especially when addressing student concerns. By seeking parent/caregivers and teachers' input regarding preferred methods of communication, districts may find that some of their current practices need to change. They may also gain confirmation regarding which of their current practices are effective. The most important aspect of the inquiry will be that the district is seeking input from their parent/caregivers and teachers in an effort to make parent/caregiver involvement an easier process.

5.3 LIMITATIONS

There are several limitations to this study. First, as parent/caregivers and teachers reported on their own levels of involvement and use of communication tools, etc., their personal perceptions

may vary from one person to the next. Thus, all ratings may not be measured on the same relative scale. Next, questions may have been answered to meet societal expectations of what parent/caregivers or teachers are likely to think. Additionally, the small size of this study and the imbalanced sample size between parent/caregiver and teacher participants may make it difficult to generalize the results and implications to other districts.

5.4 CONCLUSIONS

Collaboration between teachers and parent/caregivers maximizes a student's school experiences (Epstein, 1995). As Olmstead (2011) posits, "When teachers take actions to cultivate instructional partnerships with parent/caregivers, those parent/caregivers are more likely to support their children's learning at home" (p.15). The results of this study suggest that technology is helping to cultivate this partnership, as the survey and interview data mirror what the research says about use of technology to support parent/caregiver involvement. The data also shows that parent/caregiver involvement can look different for each family. These varying family situations call for parent/caregivers to support their children differently; any form of involvement should not be discredited. Thus, the results of this research reinforce the notion that Lee and Bowen (2006) emphasize that, regardless of their circumstances, all parent/caregivers want their children to succeed. As districts recognize that they cannot control or limit the variety of ways in which parent/caregivers choose to be involved, they should also recognize that they do have control over their own communication processes. Therefore, acknowledging what they can and cannot control, districts should focus on providing stability and consistency through their processes in order to reach as many unique family structures as possible.

This study finds that email and other instant messaging communication has provided an efficient mechanism for parent/caregivers and teachers, regardless of how parent/caregivers choose to be involved in their children's schooling. Specifically, the results of this study agree with Thompson, Mazer and Grady (2015) and Ho, Hung and Chen (2013) that the efficiency of technology is key. Parent/caregivers like the asynchronous nature of communication through technology so they are able to check on information when they can (Thompson & Mazer, 2012); they also like that technology allows them time to process the information before responding. This finding, too, aligns with previous research offered by Robert and Dennis (2005) and Thompson, Mazer and Grady (2015). Finally, as Constantino (2003) found that working parent/caregivers find it difficult to be involved in their children's academics, so did this study. Communication via technology between teacher and parent/caregiver is becoming more prevalent, and the two parties are finding success with this approach. A strong connection exists between this study and previous research. The mechanisms in place in this district work well to support parent/caregivers' involvement in their children's schooling. The district should take advantage of this to whatever extent its use can optimize the partnership.

A noteworthy point is that parent/caregivers and teachers emphasized that technology is not the sole factor to the relationship. They both expressed the need for a personal contact when any type of concern regarding the child arises. Thus, technology is just one ingredient, albeit an important one, in a larger formula that supports parent/caregiver involvement. As Figure 3 depicts, technology is contributing in positive ways to parent/caregiver-teacher communication:

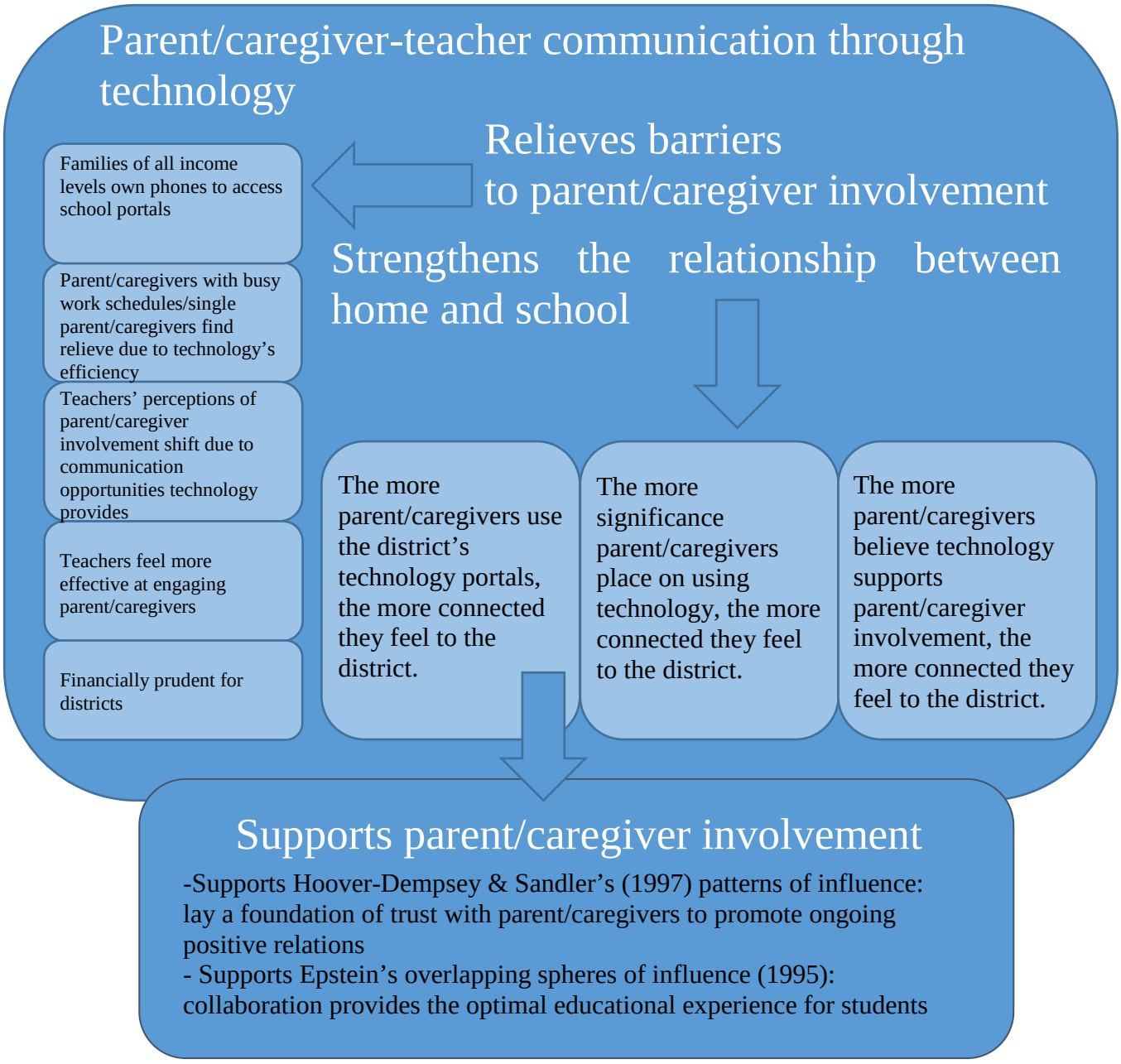

Figure 3. The effects of technology on parent/caregiver involvement

Technology can neutralize barriers to parent/caregiver involvement at the parent/caregiver, teacher, and school/community levels (Hoover-Dempsey & Sandler, 1997). It can also strengthen the relationship between home and school (Epstein, 1995). Both the relief of barriers and the parent/caregiver-teacher collaboration show promise that parent/caregivers can develop

long-standing positive relationships with their children's schools because of the effective use of technology.

In a society that is highly driven by the ease of technology, parent/caregivers and teachers are fortunate that its use supports their efforts. Thus, the broadening influence of technology warrants further exploration of its use to support parent/caregiver involvement. With decades of research on the topic of parent/caregiver involvement, it is encouraging to see that the efficiency and productivity of technology is providing in-roads for families and schools.

APPENDIX A

PARENT/CAREGIVER SURVEY QUESTIONS

Survey question 1: The following activities are often used to describe types of parent/caregiver involvement in schools. For each activity, select how valuable it is to you: (Likert-type scale using Very Valuable, Valuable, Somewhat Valuable, Not Very Valuable, Not Valuable at All)

-Volunteering at school
-Chaperoning field trips
-Donating Items to the classroom
-Attending Open House
-Attending PTO meetings
-Participating in Fund Raisers

Survey question 2: "The following activities are often used to describe types of parent/caregiver involvement in schools. For each activity, select how important it is to you: (Likert-type scale using Very Important, Important, Somewhat Important, Not Very Important, Not Important at All)

-Communicating with my child's teacher
-Asking my child about his/her school day
-Checking my child's homework
-Reading with my child or encouraging my child to read
-Helping my child when he/she has questions about assignments
-Checking my child's backpack
-Following my child's progress
-Staying informed about school events
-Providing children with experiences (e.g., vacations, visits to museums, zoo)

Survey question 3: "The following are statements often used to describe barriers to why parent/caregivers do not get involved in their child's education. For each statement, check how much you agree or disagree that this is a barrier for you." (Likert-type scale using Strongly Agree, Agree, Agree Just a Little, Disagree, Strongly Disagree)

-I don't speak or understand English
-I don't have time due to work or family needs

-I don’t know how to help my child
-I think it’s the school’s job to educate my child
-I am not comfortable talking to my child’s teacher
-I do not feel welcomed at the school
-I do not know how to get involved

Survey question 4: Do you have access to a device at home that allows access to the Internet?
-Yes
-No

Survey question 5: Do you have access to a device at work that allows access to the Internet?
-Yes
-No
-N/A

Survey question 6: How often do you check the Hermitage School District (HSD) website for information?
-Daily
-1-2 times per week
-1-2 times per month
-Never

Survey question 7: How often do you check HSD’s online grade book portal, Power school?
-Daily
-1-2 times per week
-1-2 times per month
-Never

Survey question 8: If your child’s teacher uses a communication portal (such as Remind, Class Dojo, Google classroom, Seesaw, classroom website), how often do you check the portal for information?
-Daily
-1-2 times per week
-1-2 times per month
-Never
-My child’s teacher does not use a portal

Survey question 9: What is your preferred method of communicating with the teacher?
-Phone
-Email
-In person
-Through a written letter sent with my child

-Teacher's communication portal (Remind, Class Dojo, Google classroom, Seesaw, classroom website)
-Other (please specify)

Survey question 10: Have you exchanged messages using the communication portal your child's teacher uses? (such as Remind, Class Dojo, Google classroom, Seesaw, classroom website)

-Yes
-No

Survey question 11: If you have not exchanged messages with your child's teacher through the teacher's communication portal, is this a form of communication you would like to use to send and receive information about your child?

-Yes
-No

Survey question 12: Do you own a cell phone?

-Yes
-No

If so, have you provided the number to the teacher?

-Yes
-No

Survey question 13: Has your child's teacher provided you with his/her personal cell phone number?

-Yes
-No

Survey question 14: Have you exchanged text messages with your child's teacher about your child?

-Yes
-No

Survey question 15: If you have not exchanged text messages with your child's teacher, is this a form of communication you would like to use to send and receive information about your child?

-Yes
-No

Survey question 16: Does your child's teacher use email to communicate information and/or updates about the class?

-Yes
-No

Survey question 17: Do you use email to communicate with your child's teacher?

-Yes

-No

Survey question18: If you have had communication through technology with your child's teacher, please select the reason(s) for the communication with your child's teacher. (Check all that apply).

-Academics

-Behavior

-Homework

-Volunteering

-School events

-Other, please specify

Survey question 19: Do you feel that certain communications should take place through a live conversation versus through technology?

-Yes

-No

If yes, which communication should be left for live conversations versus through technology?

-Academics

-Behavior

-Homework

-Volunteering

-School events

-Other, please specify

Survey question 20: How important is it to you that the district provides means for communicating with families through the use of technology?

-Very important

-Important

-Somewhat important

-Not important

Survey question 21: Do you believe that the use of technology for parent/caregiver/teacher communications positively influences a parent/caregiver's ability to stay involved in their child's education?

-Strongly agree

-Agree

-Neutral

-Disagree

-Strongly disagree

Survey question 22: The term "connectedness" in parent/caregiver involvement refers to the comfort level that a parent/caregiver develops with teachers and staff in their child's school.

The higher the parent/caregiver's comfort level, the greater the trust and the greater the potential to work cooperatively on behalf of the child.

Please rate how well connected you feel to your child's school.
-Very connected
-Connected
-Neutral
-Somewhat disconnected
-Very disconnected

Survey question 23. What is your gender

-male
-female

Survey question 24. What is your ethnicity

-Hispanic/Latino
-African American
-Caucasian
-Native American
-Asian/Pacific Islander
-Other

Survey question 25. What is your total household income?

-Less than $10,000
-$10,000-$19,999
-$20,000-$29,999
-$30,000-$39,999
-$40,000-$49,999
-$50,000-$59,999
-$60,000-$69,999
-$70,000-$79,999
-$80,000-$89,999
-$90,000-$99,999
-$100,000-$150,000
-More than $150,000

Survey question 26. What is your age?

-Under 20
-20-29
-30-39
-40-49
-50-59
-60-69
-70 or over

APPENDIX B

PARENT/CAREGIVER INTERVIEW QUESTIONS

1. On a scale of 1 to 5 (one being the worst, and 5 being the best), please rate the district's communication with parent/caregivers based on your experience.

2. Can you provide specific examples that helped you form your opinion?

3. Does a teacher's method of communication impact how involved you are in your child's education from one year to the next? Please explain why or why not.

4. What types of parent/caregiver involvement do you believe electronic communications supports? Please answer Yes or No for each example.

-Volunteering at school
-Chaperoning field trips
-Donating Items to the classroom
-Attending Open House
-Attending PTO meetings

-Participating in Fund Raisers
-Communicating with my child's teacher
-Asking my child about his/her school day
-Checking my child's homework
-Reading with my child or encouraging their child to read
-Helping my child when he/she has questions about assignments
-Checking my child's backpack
-Following my child's progress
-Staying informed about school events
-Providing my child with experiences (e.g., vacations, visits to museums, zoo)

5. Do you believe that electronic communication has helped you become more involved as a parent/caregiver?

6.What advantages do you feel that electronic communications have?

7. What disadvantages do you feel electronic communications have?

8.What recommendations can you give me as the district looks for ways to improve its communications with parent/caregivers?

9. If you have an older child in the district, how has technology impacted the method, frequency and ease of school communications?

APPENDIX C

TEACHER SURVEY QUESTIONS

Survey question 1: “The following activities are often used to describe types of parent/caregiver involvement in schools. For each activity, select how valuable it is to you: (Likert-type scale using Very Valuable, Valuable, Somewhat Valuable, Not Very Valuable, Not Valuable at All)

-Volunteering at school
-Chaperoning field trips
-Donating Items to the classroom
-Attending Open House
-Attending PTO meetings
-Participating in Fund Raisers

Survey question 2: “The following activities are often used to describe types of parent/caregiver involvement in schools. For each activity, select how important it is to you: (Likert-type scale using Very Important, Important, Somewhat Important, Not Very Important, Not Important at All)

-Communicating with their child’s teacher
-Asking their child about his/her school day
-Checking their child’s homework
-Reading with their child or encouraging him/her to read
-Helping their child when he/she has questions about assignments
-Checking their child’s backpack
-Following their child’s progress
-Staying informed about school events
-Providing children with experiences (e.g., vacations, visits to museums, zoo)

Survey question 3: “The following are statements often used to describe barriers to why parent/caregivers do not get involved in their child’s education. For each statement, check how much you agree or disagree that this is a barrier for parent/caregivers.” (Likert-type scale using Strongly Agree, Agree, Agree Just a Little, Disagree, Strongly Disagree)

-Parent/caregiver does not speak or understand English

- Parent/caregiver does not have time due to work or family needs
- Parent/caregiver does not know how to help my child
-Parent/caregiver thinks it's the school's job to educate their child
-Parent/caregiver is not comfortable talking to the child's teacher
- Parent/caregiver does not feel welcomed at the school
- Parent/caregiver does not know how to get involved

Do you exchange messages with parent/caregivers through the communication portal you choose to use (such as Remind, Class Dojo, Google classroom, Seesaw, Classroom website)?

-Yes
-No

Survey question 5: Do you own a cell phone?
-Yes
-No

Survey question 6: Do you provide your parent/caregivers with your personal cell phone number?
-Yes
-No

Survey question 7: Have you exchanged text messages with parent/caregivers with your cell phone?
-Yes
-No

Survey question 8: If you have not exchanged text message with parent/caregivers, is this a form of communication you would be open to using to send and receive information about students?
-Yes
-No

Survey question 9: Do you use email to communicate information and/or updates about the class to parent/caregivers?
-Yes
-No

Survey question 10: Do you use email to communicate directly with parent/caregivers?
-Yes
-No

Survey question 11: What is your preferred method of communicating with parent/caregivers?
-Phone
-Email

-In person
-Written communication sent home with students
-Portal (Remind, Class Dojo, Google classroom, Seesaw, classroom website, etc.)
-Other (please specify)

Survey question 12: What are the reasons that you have contact with parent/caregivers? (Check all that apply).
-Academics
-Behavior
-Homework
-Volunteering
-School events
-Other, please specify

Survey question 13: Do you feel that certain communications should take place through a live conversation versus through technology?
-Yes
-No

If yes, which communication should be left for live conversations versus through technology?
-Academics
-Behavior
-Homework
-Volunteering
-School events
-Other, please specify

Survey question 14: How important is it to you that teachers are provided with means for communicating with families through the use of technology?
-Very important
-Important
-Somewhat important
-Not important

Survey question 15: Do you believe that the use of technology for parent/caregiver/teacher communications positively influences a parent/caregiver's ability to stay involved in their child's education?
-Strongly agree
-Agree
-Neutral
-Disagree
-Strongly disagree

APPENDIX D

TEACHER INTERVIEW QUESTIONS

1.What methods of electronic communication do you use with parent/caregivers? (Please list as many as you use)

2.What methods of communication do you use for the following topics: (have them organize cards under one-way/two-way communication headings, then have them organize under personal communication/electronic communication)

-Academics
-Behavior
-Homework
-Volunteering
-School events
-Other, please specify

3.What types of parent/caregiver involvement do you believe electronic communications supports? Please answer Yes or No for each example.

-Volunteering at school
-Chaperoning field trips
-Donating Items to the classroom
-Attending Open House
-Attending PTO meetings
-Participating in Fund Raisers

-Parent/caregiver communicating with my teacher
-Parent/caregiver asking their child about his/her school day
-Parent/caregiver checking their child's homework
-Parent/caregiver reading with their child or encouraging their child to read
-Parent/caregiver helping their child when he/she has questions about assignments
-Parent/caregiver checking their child's backpack
-Parent/caregiver following child's progress
-Parent/caregiver staying informed about school events

-Parent/caregiver providing children with experiences (e.g., vacations, visits to museums, zoo)

4.Do you believe that electronic communications have helped parent/caregivers become more involved in their child's educational experiences?

5.Please identify one of your student's parent/caregivers with whom you have had two-way communication on a regular basis.

6.Please identify one of your student's parent/caregivers with whom you have had minimal two-way communication this year.

APPENDIX E

TEACHER SURVEY RECRUITMENT LETTER

Dear third grade teacher,

I am conducting a research study as a doctoral student in the University of Pittsburgh's Education Leadership program. The purpose of this research study is to gain a better understanding of how teachers and parent/caregivers define parent/caregiver involvement, as well as to better understand how parent/caregiver-teacher communications are being used. Completion of this study will fulfill the dissertation requirements for the doctoral degree and hopefully contribute to the body of research regarding how schools can support parent/caregiver involvement through their communications.

I am contacting you today because I have chosen the conduct my research using third grade teachers' and parent/caregivers' input. I would be most appreciative if you would take the time to consider participation in this study as it will provide me a teacher's perspective on our school's communication practices and our work to involve parent/caregivers.

Using the results of the surveys, as well as the results of parent/caregiver and teacher interviews previously completed, the district will review parent/caregiver and teacher opinions, and will work to refine our current practices in response to the data.

There are no direct benefits for participation in this study, nor is there any compensation. Your participation is voluntary, and you may choose to discontinue your participation at any time. There are no risks associated with participation. Approval from the Institutional Review Board at the University of Pittsburgh was sought and granted prior to conducting this inquiry.

Should you choose to participate in the study, I thank you in advance. In the next few days, I will follow up with you in person, to answer any questions you might have, to seek your agreement to participate, and to determine whether you wish to complete the survey online, or if you wish to complete a paper version.

Thank you in advance for your consideration and willingness to contribute to this study.

Respectfully,

Nanci Hosick

APPENDIX F

PARENT/CAREGIVER SURVEY RECRUITMENT LETTER

Dear third grade parent/caregiver,

I am conducting a research study as a doctoral student in the University of Pittsburgh's Education Leadership program. The purpose of this research study is to gain a better understanding of how teachers and parent/caregivers define parent/caregiver involvement, as well as to better understand how parent/caregiver-teacher communications are being used. Completion of this study will fulfill the dissertation requirements for the doctoral degree and hopefully contribute to the body of research regarding how schools can support parent/caregiver involvement through their communications.

I am contacting you today because I have chosen the conduct my research using third grade teachers' and parent/caregivers' input. I would be most appreciative if you would take the time to consider participation in this study as it will provide me a teacher's perspective on our school's communication practices and our work to involve parent/caregivers.

This is a study to learn more about how parent/caregivers and teachers define parent/caregiver involvement, what parent/caregivers and teachers see as barriers to parent/caregiver involvement, and how parent/caregivers and teachers are communicating with one another. In addition, this study will explore parent/caregivers' and teachers' opinions regarding the use technology for parent/caregiver-teacher communications. To conduct this study, parent/caregivers and teachers will answer survey questions to help the district understand your opinions.

There are no direct benefits for participation in this study, nor is there any compensation. Your participation is voluntary, and you may choose to discontinue your participation at any time. There are no risks associated with participation. Approval from the Institutional Review Board at the University of Pittsburgh was sought and granted prior to conducting this inquiry.

Should you choose to participate in the study, I thank you in advance. You have two options in regard to how you participate. You may take the anonymous survey online, using the link (insert Qualtrics link here), or you may complete the paper form of the survey which is included in this packet.

Thank you in advance for your consideration and willingness to contribute to this study.

Respectfully,

Nanci Hosick

APPENDIX G

PARENT/CAREGIVER INTERVIEW RECRUITMENT SCRIPT

Hello, Mr. or Ms._____,

My name is Nanci Hosick, and I am the Director of Special Services for XXXXX School District. I am conducting a research study as a doctoral student in the University of Pittsburgh's Education Leadership program. The purpose of this research study is to gain a better understanding of how teachers and parent/caregivers define parent/caregiver involvement, as well as to better understand how parent/caregiver-teacher communications are being used. Completion of this study will fulfill the dissertation requirements for the doctoral degree and hopefully contribute to the body of research regarding how schools can support parent/caregiver involvement through their communications.

I am contacting you today because you have been selected as a potential participant in this inquiry. As I understand it, you either have already had communication with your child's teacher more than nine times this semester, or you currently have only been able to communicate with them two or fewer times. I would be most appreciative if you would take the time to consider participation in this study as it will provide me a parent/caregiver's perspective on our schools communication and work to involve parent/caregivers.

If I may explain further, this is a study to learn more about how parent/caregivers define parent/caregiver involvement in their child's schooling, what parent/caregivers see as barriers to parent/caregiver involvement, and how parent/caregivers and teachers are communicating with one another. In addition, this study will explore parent/caregivers' and teachers' opinions regarding the use technology for parent/caregiver-teacher communications. To conduct this study, parent/caregivers will answer interview questions to help the district understand parent/caregivers' opinion regarding the way we currently communicate with you. The third grade teachers will also be interviewed regarding this subject matter.

Using the results of the interviews, as well as the results of parent/caregiver surveys that will come at a later date, the district will review parent/caregiver and teacher opinions, and will work to refine our current practices in response to the data.

There are no direct benefits for participation in this study, nor is there any compensation. Your participation is voluntary, and you may choose to discontinue your participation at any time. There are no risks associated with participation. Approval from the Institutional Review Board at the University of Pittsburgh was sought and granted prior to conducting this inquiry.

Should you choose to participate in the study, I thank you in advance. At the time of your interview, I will ask you to sign a copy of this, indicating that you've received this informed consent letter, are participating voluntarily, and grant me permission to utilize your de-identified data as a part of the study's reports.

Thank you in advance for your consideration and willingness to contribute to this study.

Respectfully,

Nanci Hosick

_____	_____	_____
Printed Name	Signed Name	Date

APPENDIX H

TEACHER INTERVIEW RECRUITMENT LETTER

Dear third grade teacher,

I am conducting a research study as a doctoral student in the University of Pittsburgh's Education Leadership program. The purpose of this research study is to gain a better understanding of how teachers and parent/caregivers define parent/caregiver involvement, as well as to better understand how parent/caregiver-teacher communications are being used. Completion of this study will fulfill the dissertation requirements for the doctoral degree and hopefully contribute to the body of research regarding how schools can support parent/caregiver involvement through their communications.

I am contacting you today because I have chosen the conduct my research using third grade teachers' and parent/caregivers' input. I would be most appreciative if you would take the time to consider participation in this study as it will provide me a teacher's perspective on our school's communication practices and our work to involve parent/caregivers.

This is a study to learn more about how parent/caregivers and teachers define parent/caregiver involvement, what parent/caregivers and teachers see as barriers to parent/caregiver involvement, and how parent/caregivers and teachers are communicating with one another. In addition, this study will explore parent/caregivers' and teachers' opinions regarding the use technology for parent/caregiver-teacher communications. To conduct this study, parent/caregivers and teachers will answer interview questions to help the district understand parent/caregivers' opinion regarding the way we currently communicate with you.

Using the results of the interviews, as well as the results of parent/caregiver and teacher surveys that will come at a later date, the district will review parent/caregiver and teacher opinions, and will work to refine our current practices in response to the data.

There are no direct benefits for participation in this study, nor is there any compensation. Your participation is voluntary, and you may choose to discontinue your participation at any time. There are no risks associated with participation. Approval from the Institutional Review Board at the University of Pittsburgh was sought and granted prior to conducting this inquiry.

Should you choose to participate in the study, I thank you in advance. In the next few days, I will follow up with you in person, to answer any questions you might have and to seek your agreement to participate. If you agree to participate, I will ask you to sign a copy of this letter, indicating that you've received this informed consent letter, are participating voluntarily, and grant me permission to utilize your de-identified data as a part of the study's reports.

Thank you in advance for your consideration and willingness to contribute to this study.

Respectfully,

Nanci Hosick

_____	_____	_____
Printed Name	Signed Name	Date

APPENDIX I

INSTITUTIONAL REVIEW BOARD APPROVAL FOR SURVEYS

University of Pittsburgh
Institutional Review Board

3500 Fifth Avenue
Pittsburgh, PA 15213
(412) 383-1480
(412) 383-1508 (fax)
http://www.irb.pitt.edu

Memorandum

To: Nanci Hosick
From: IRB Office
Date: 12/18/2017
IRB#: PRO17090339
Subject: PARENT INVOLVEMENT IN 2017: PAST CHALLENGES AND FUTURE POSSIBILITIES IN A TECHNOLOGY-RICH SOCIETY

The above-referenced project has been reviewed by the Institutional Review Board. Based on the information provided, this project meets all the necessary criteria for an exemption, and is hereby designated as "exempt" under section

45 CFR 46.101(b)(2)

Please note the following information:

- Investigators should consult with the IRB whenever questions arise about whether planned changes to an exempt study might alter the exempt status. Use the "**Send Comments to IRB Staff**" link displayed on study workspace to request a review to ensure it continues to meet the exempt category.
- It is important to close your study when finished by using the "**Study Completed**" link displayed on the study workspace.
- Exempt studies will be archived after 3 years unless you choose to extend the study. If your study is archived, you can continue conducting research activities as the IRB has made the determination that your project met one of the required exempt categories. The only caveat is that no changes can be made to the application. If a change is needed, you will need to submit a NEW Exempt application.

Please be advised that your research study may be audited periodically by the University of Pittsburgh Research Conduct and Compliance Office.

APPENDIX J

INSTITUTIONAL REVIEW BOARD APPROVAL FOR INTERVIEWS

University of Pittsburgh
Institutional Review Board

3500 Fifth Avenue
Pittsburgh, PA 15213
(412) 383-1480
(412) 383-1508 (fax)
http://www.irb.pitt.edu/

Memorandum

To: Nanci Hosick
From: IRB Office
Date: 11/28/2017
IRB#: PRO17090340
Subject: PARENT INVOLVEMENT IN 2017: PAST CHALLENGES AND FUTURE POSSIBILITIES IN A TECHNOLOGY-RICH SOCIETY

The above-referenced project has been reviewed by the Institutional Review Board. Based on the information provided, this project meets all the necessary criteria for an exemption, and is hereby designated as "exempt" under section

45 CFR 46.101(b)(2)

Please note the following information:

- Investigators should consult with the IRB whenever questions arise about whether planned changes to an exempt study might alter the exempt status. Use the **"Send Comments to IRB Staff"** link displayed on study workspace to request a review to ensure it continues to meet the exempt category.
- It is important to close your study when finished by using the **"Study Completed"** link displayed on the study workspace.
- Exempt studies will be archived after 3 years unless you choose to extend the study. If your study is archived, you can continue conducting research activities as the IRB has made the determination that your project met one of the required exempt categories. The only caveat is that no changes can be made to the application. If a change is needed, you will need to submit a NEW Exempt application.

Please be advised that your research study may be audited periodically by the University of Pittsburgh Research Conduct and Compliance Office.

APPENDIX K

DISTRICT APPROVAL LETTER

Daniel J. Bell, Ed.D., Superintendent
Central Administrative Office

Telephone: 724.981.8750, ext. 6010
District Fax: 724.981.5080

November 13, 2017

University of Pittsburgh
IRB Approval Committee
Hieber Building
3500 5th Avenue, Suite 302
Pittsburgh, PA 15213

To Whom It May Concern:

Nanci Hosick, who is the Director of Special Services for the School District, has requested to conduct her dissertation study in Elementary School, our K-3 building. I understand the working title of her dissertation is "Parent involvement in 2017: Past challenges and future possibilities in a technology-rich society". The purpose of this study is to gain a better understanding of parents' and teachers' beliefs about parent involvement, and to gain a better understanding of whether or not technology is facilitating parent involvement in the district.

The seven third-grade teachers in Elementary will be interviewed, as well as two parents from each third-grade homeroom, totaling 14 parents. In addition, the seven third-grade teachers and all third-grade parents will be asked to participate in a survey. One goal of this study is to compare parents' and teachers' definitions of parent involvement and barriers to parent involvement in order to discern where gaps in definitions might exist. A second goal is to compare parents' and teachers' beliefs regarding how technology supports parent communication and parent involvement. Ultimately, the interviews in this study, along with accompanying surveys, will inform the school district's communication practices with its parents, thus facilitating parent involvement.

Based on the above information, Nanci Hosick has my permission to proceed with this study in the School District. If you have any questions, please do not hesitate to contact me.

Sincerely,

Daniel Bell, Ed. D.
Superintendent of Schools

APPENDIX L

SIGNED APPROVAL FOR USE OF MODIFIED SURVEY

December 4, 2017

Dear Dr. Olmstead,

On October 10, 2017, I emailed you requesting access to your survey and focus group questions within your dissertation, "Using Technology to Increase Parent Involvement in Schools". I am completing a doctoral dissertation at the University of Pittsburgh entitled, "Parent involvement in 2017: Past challenges and future possibilities in a technology-rich society". I would like permission to use your survey in a modified form to conduct my research.

The survey will be modified to apply to my local school district. For example, in some instances, your questions speak in hypothetical terms, asking parents if they'd be willing to use certain communication portals if Arovista provided such access. I've modified such questions because these types of portals are currently utilized in my district. Additionally, I have eliminated certain questions that don't apply as specifically to my focus area. I have attached a copy of my version of the survey so you may see the modifications I've made.

The requested permission extends to any future revisions and editions of my dissertation, including non-exclusive world rights in all languages, to the electronic publication of my dissertation by the University of Pittsburgh, and to the prospective publication of my dissertation by ProQuest. ProQuest may supply copies of my dissertation on demand. These rights will in no way restrict publication of the material in any other form by you or by others authorized by you. Your signing of this letter will also confirm that you own [or your company owns] the copyright to the above-described material.

If these arrangements meet with your approval, please sign this letter where indicated below and return it to me in the enclosed return envelope or by scanning and emailing it to me.

Sincerely,

Nanci Hosick

Nanci Hosick

PERMISSION GRANTED FOR THE USE REQUESTED ABOVE:

Christine Olmstead, Ed.D.

Date: 12/12/17

APPENDIX M

SURVEY DATA ANALYSIS

Statistical Consulting conducted by Jacob Leisey-Bartsch, Ph.D. student

University of Pittsburgh Statistics department

Initial analysis:

We begin by looking at the individual associations between pairs of variables. Specifically, we want to consider the following associations:

Questions 6 and 20	Questions 6 and 21	Questions 6 and 22
Questions 7 and 20	Questions 7 and 21	Questions7 and 22
Questions 8 and 20	Questions 8 and 21	Questions 8 and 22
Questions 9 and 20	Questions 9 and 21	Questions 9 and 22
Questions 10 and 20	Questions 10 and 21	Questions 10 and 22

Six of these variables (questions 6, 7, 8, 20, 21, 22) are ordered in some capacity. In order to measure the association between ordered variables, one can use a variant of the traditional correlation coefficient. This variant is called Kendall's Tau Correlation. Kendall's Tau has also

been shown to work when one or both of the variables are binary. Since question 10 is a binary variable, we can also calculate Kendall's Tau when question 10 is one of the variables. We calculate the following Kendall's Tau Correlations:

	Q6	Q7	Q8	Q10
20	0.235048985893214	0.196899253952814	0.168957872742659	0.287611054199382
21	0.143285101834317	0.0981369467178877	0.115345086344699	0.210329856592122
22	0.283322220955897	0.334628815082533	0.473939179835411	0.394794762377934

Heuristically, 0.3 is considered a lower cutoff for moderate correlation, so we highlighted the three correlations that are above this threshold. There appears to be a moderate positive association between question 7 and question 22, question 8 and question 22, and question 10 and question 22.

Note the interpretations:

As parent/caregivers used the online grade book more (question 7), they tended to feel more connected (question 22)

As parent/caregivers used the communication portal more (question 8), they tended to feel more connected (question 22)

Parent/caregivers who exchanged messages through the portal (question 10) tended to feel more connected (question 22)

Furthermore, we also calculate the p-values to test if these correlations indicate significant associations. We find the following p-values:

	Q6	Q7	Q8	Q10
20	0.0105801028691382	0.0292791214138205	0.0647036615203702	0.0031625114779728
21	0.124096895222008	0.283666329681759	0.213298747767881	0.0331750529883726
22	0.00181958062303267	0.000177708714296345	1.57206285004864e-07	4.12943023565303e-05

We use the traditional significance level of 0.05 and highlight any p-value below this level. These highlight p-values indicate a significant association. Therefore, we find the following significant associations:

Questions 6 and 20 Questions 6 and 22

Questions 7 and 20 Questions7 and 22

Questions 8 and 22

Questions 10 and 20 Questions 10 and 21 Questions 10 and 22

The interpretations are similar to above:

As parent/caregivers check the website more often (question 6), they tend to place more importance on tech communication (question 20)

As parent/caregivers check the website more often (question 6), they tend to feel more connected (question 22)

As parent/caregivers used the online grade book more (question 7), they tend to place more importance on tech communication (question 20)

Parent/caregivers who exchanged messages through the portal (question 10) tended to place more importance on tech communication (question 20)

Parent/caregivers who exchanged messages through the portal (question 10) tended to place more positive belief on tech communication (question 21)

(7 and 22, 8 and 22, 10 and 22 already interpreted)

Now, we want to test the following associations:

Questions 9 and 20 Questions 9 and 21 Questions 9 and 22

Since question 9 is a categorical variable with no inherent ordering, we want to consider the associations between categorical variables and ordered variables. Unfortunately, there is minimal literature regarding this subject. In order to work around this, we treat questions 20, 21, and 22 as categorical (and unordered), so we are considering the association between pairs of categorical variables (which has an extensive literature).

Unfortunately, there is no analog to the correlation coefficient in this framework. However, there is a corresponding significance test that we can still perform. We considered using a chi-square test for independence, but found that the assumptions of the test were not met. Therefore, we opted to use Fisher's exact test to test the significance of the associations. We found the following p-values:

	Q9

	Q9
Q20	0.05726
Q21	0.02969
Q22	0.7297

We again highlighted the significant p-values. In this case, we find that the only significant association is between question 9 and question 21.

Notes:

First, the analysis that we have presented thus far is simply a pairwise evaluation of the variables. Just because we found significance individually between questions 10 and 20, 10 and 21, and 10 and 22 does not mean that questions 20, 21 and 22 are jointly associated with question 10. While this could be the case, it could also be that there is considerable overlap between questions 20, 21, and 22 (in which case, they might not be jointly significant). Further testing (that simultaneously considers multiple variables) is still needed to make conclusions about the joint significance. Unfortunately, it was these models that produced questionable results and need to be recoded. They will be sent in a follow-up report as soon as possible!

Second, we created a considerable number of unadjusted p-values in this report, which could lead to a potential multiple testing problem. Multiple testing effectively means that you to have a better chance of finding significant results incorrectly (If you generate 100 p-values, you are likely to find by chance at least one that is significant). If you choose to use these p-values in your own report, then it is strongly encouraged that you acknowledge that these are raw,

unadjusted p-values. Alternatively, if you'd like, we can make p-value adjustments that account for the considerable number of p-values that we generated (and you can report the results based off the adjusted p-values). However, at this point, we simply wanted to report the raw p-values.

Follow-up:

After recoding the models in SAS, we were finally able to create general models that could simultaneously consider all of the explanatory variables.

Before we discuss the models further, I'd like to take a moment to discuss the explanatory variables (questions 20, 21, and 22), which are each measured on a different Likert Scale. There has been some debate amongst statisticians regarding the treatment of Likert Scale variables. One suggestion is to consider these variables continuous and code them as 1, 2, 3, etc. Another suggestion is to consider these variables categorical and create a dummy variable for each level. We would like to note that assuming/treating the variables as continuous is a much stronger assumption. However, if we are to make this assumption, then there are far fewer effects/parameters to calculate in the model (which would increase the power of the model). In this case, we chose to consider these variables as continuous. This choice was made with the above notes in mind, but also with the notes that follow in mind as well. In several cases, treating the variables as categorical led to models with nearly 30 parameters. We believe that this is too many parameters to estimate reliably with a sample size of 100. Furthermore, if we treat the variables as categorical, there were quite a few combinations of responses to questions 20, 21, and 22 that never appeared in the sample. One example of such a combination was "Not important", "Strongly disagree", and "Very disconnected". Since there were numerous

combinations that do not appear in the sample, we took this as further evidence that we should not treat the variables as categorical.

Now, we move on to the models that we created. Question 10 was the most straightforward of the response variables, as it was a simple binary (yes/no) response. We applied a logistic regression model to this variable, as logistic regression is one of the standard models for binary variables. We obtained the following results:

From the output, we see small p-values for the likelihood ratio test, score test, and Wald test. This result suggests that questions 20, 21, and 22 have joint significance on question 10. We can also evaluate individual significance within this three variable model. The second set of highlighted p-values suggests that questions 20 and 22 are individually significant within this model (as these are the only two that are less than 0.05). In order to determine the estimated effect of these two questions, we look at the odds ratio estimates.

Question 20 has an odds ratio of 2.295. This means that if we increase the parent/caregiver's response to question 20 by 1, then the odds of the parent/caregiver saying "Yes" to question 10 are 2.295 times greater. As an example, consider two parent/caregivers who responded in nearly identical ways. However, the first parent/caregiver said "Not important" to question 20, while the second parent/caregiver said "Somewhat important" to question 20. The odds ratio of 2.295 suggests that the odds of the second parent/caregiver saying "Yes" to question 10 is 2.295 times greater than the first parent/caregiver. We can make similar interpretations between ("Somewhat important" and "Important") and ("Important" and "Very

important"). **In essence, as parent/caregivers place more importance on communicating through technology, they are more likely to say "Yes".**

Question 22 has an odds ratio of 2.807. This means that if we increase the parent/caregiver's response to question 22 by 1, then the odds of the parent/caregiver saying "Yes" are 2.807 times greater. As an example, consider two parent/caregivers who responded in nearly identical ways. However, the first parent/caregiver said "Very disconnected" to question 22 and the second parent/caregiver said "Somewhat disconnected". The odds ratio of 2.807 suggests that the odds of the second parent/caregiver saying "Yes" to question 10 is 2.807 times greater than the first parent/caregiver. We can make similar interpretations between ("Somewhat disconnected" and "Neutral"), ("Neutral" and "Connected"), and ("Connected" and "Very connected"). **In essence, as a parent/caregiver feels more connected, they are more likely to say "Yes".**

Questions 6, 7, and 8 have the same response options ("Never", "1-2 times per month", "1-2 times per week", "Daily"). Since these response options are very clearly ordered, we choose to utilize a cumulative logit model on each of these three response variables. However, we consider two kinds of cumulative logit models, one with proportional odds and one without proportional odds. The model with proportional odds is the simpler model that assumes that each explanatory variable has the same effect for all levels of the response. The model without proportional odds does not make this assumption (so an explanatory variable may have a different effect at different levels of the response variable). For questions 6, 7, and 8, we begin by using the simpler cumulative logit model (proportional odds). Fortunately, when we create this model in SAS, the program outputs a test indicating if the proportional odds assumption is a

good assumption or not. Therefore, if the output indicates the assumption is good, we will use the results provided. If the output indicates the assumption is bad, we will throw away this model and replace it with the more complex model (that does not assume proportional odds).

Question 6 output:

We begin by testing if the proportional odds assumption holds:

Score Test for the Proportional Odds Assumption		
Chi-Square	**DF**	**Pr > ChiSq**
15.4283	6	0.0172

Since the p-value is less than 0.05, we have reason to believe that the proportional odds assumption does not hold. Therefore, we switch to the model that does not make this assumption and view those results instead.

Model Fit Statistics		
Criterion	**Intercept Only**	**Intercept and Covariates**
AIC	219.365	210.575
SC	227.120	241.594
-2 Log L	213.365	186.575

Testing Global Null Hypothesis: BETA=0			
Test	**Chi-Square**	**DF**	**Pr > ChiSq**
Likelihood Ratio	26.7902	9	0.0015
Score	23.2466	9	0.0057
Wald	19.3298	9	0.0225

Type 3 Analysis of Effects			
Effect	**DF**	**Wald Chi-Square**	**Pr > ChiSq**
Resp20	3	4.0578	0.2553
Resp21	3	7.4244	0.0595
Resp22	3	7.3974	0.0603

The first set of p-values again indicates the overall joint significance of the model. Since these p-values are all less than 0.05, we have evidence that questions 20, 21, and 22 have joint significance on question 6. We also test the individual significance of each variable within this three variable model. In order to evaluate these tests, we use the second set of p-values above. Notice that there are surprisingly no p-values in this set that are below 0.05. At this point, it would appear that while the three variables are jointly significant, they are individually insignificant within this model. However, I would like to note that the p-values for questions 21 and 22 are quite close to 0.05 and might warrant additional consideration. Additionally, since we are not using the proportional odds assumption in this model, we can further dissect the effects of questions 20, 21, and 22 (see next page for additional output).

Analysis of Maximum Likelihood Estimates						
Parameter	**Resp6**	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr > ChiSq**
Intercept	**1-2 times per month**	1	-2.7565	1.5627	3.1113	0.0778
Intercept	**1-2 times per week**	1	-10.9953	3.7542	8.5780	0.0034
Intercept	**Daily**	1	-7.7778	4.0580	3.6736	0.0553
Resp20	**1-2 times per month**	1	-0.0402	0.4238	0.0090	0.9244
Resp20	**1-2 times per week**	1	1.6807	0.9503	3.1276	0.0770
Resp20	**Daily**	1	0.7871	0.9198	0.7322	0.3922
Resp21	**1-2 times per month**	1	0.9546	0.5328	3.2101	0.0732
Resp21	**1-2 times per week**	1	-0.2940	0.8597	0.1170	0.7323
Resp21	**Daily**	1	-1.1944	1.0061	1.4093	0.2352
Resp22	**1-2 times per month**	1	0.1865	0.3520	0.2807	0.5962
Resp22	**1-2 times per week**	1	1.3414	0.6246	4.6118	0.0318
Resp22	**Daily**	1	1.8422	0.9600	3.6827	0.0550

Odds Ratio Estimates				
Effect	**Resp6**	**Point Estimate**	**95% Wald Confidence Limits**	
Resp20	**1-2 times per month**	0.961	0.419	2.204
Resp20	**1-2 times per week**	5.369	0.834	34.579
Resp20	**Daily**	2.197	0.362	13.327
Resp21	**1-2 times per month**	2.598	0.914	7.381
Resp21	**1-2 times per week**	0.745	0.138	4.019

Odds Ratio Estimates				
Effect	**Resp6**	**Point Estimate**	**95% Wald Confidence Limits**	
Resp21	**Daily**	0.303	0.042	2.176
Resp22	**1-2 times per month**	1.205	0.604	2.402
Resp22	**1-2 times per week**	3.825	1.124	13.010
Resp22	**Daily**	6.311	0.961	41.421

The first set of p-values above correspond to the significance of individual explanatory variables in this model for given levels of the response variable. Note that there is only one p-value below the 0.05 threshold. Also note that we use “Never” as the reference group in this model. Therefore, the significant p-value suggests that question 22 has a significant impact on whether the parent/caregiver responds “Never” or “1-2 times per week” to question 6.

We also see three other p-values that are borderline in significance and might be of interest. These p-values are in the rows labeled by (Resp20, 1-2 times per week), (Resp21, 1-2 times per month), and (Resp22, Daily). For clarity, we provide the interpretations of these three p-values as well:

For (Resp20, 1-2 times per week), the p-value suggests that question 20 has a (borderline) significant impact on whether the parent/caregiver responds “Never” or “1-2 times per week”.

For (Resp21, 1-2 times per month), the p-value suggests that question 21 has a (borderline) significant impact on whether the parent/caregiver responds “Never” or “1-2 times per month”.

For (Resp22, Daily), the p-value suggests that question 22 has a (borderline) significant impact on whether the parent/caregiver responds “Never” or “Daily”.

In order to analyze the significant effect, we again look at the odds ratios. The odds ratio for question 22 at response level “1-2 times per week” is 3.825. This means that if we increase the parent/caregiver’s response to question 22 by 1, then the odds of the parent/caregiver saying “1-2 times per week” (rather than “Never”) are 3.825 times greater. As an example, consider two parent/caregivers who responded in nearly identical ways. However, the first parent/caregiver said “Very disconnected” to question 22 and the second parent/caregiver said “Somewhat disconnected”. The odds ratio of 3.825 suggests that the odds of the second parent/caregiver saying “1-2 times per week” (rather than “No”) to question 12 is 3.825 times greater than the first parent/caregiver. We can make similar interpretations between (“Somewhat disconnected” and “Neutral”), (“Neutral” and “Connected”), and (“Connected” and “Very connected”). **In essence, as a parent/caregiver feels more connected, they are more likely to say “1-2 times per week” than they are to say “Never”.**

Question 7 Output:

We begin by testing the proportional odds assumption. This test yields the first box below. Notice the insignificant p-value. Therefore, we feel comfortable using the proportional odds assumption. Using this model, we get the following results:

Score Test for the Proportional Odds Assumption		
Chi-Square	**DF**	**Pr > ChiSq**
10.1839	6	0.1171

Model Fit Statistics		
Criterion	**Intercept Only**	**Intercept and Covariates**
AIC	254.804	238.478
SC	262.559	253.988
-2 Log L	248.804	226.478

Testing Global Null Hypothesis: BETA=0			
Test	**Chi-Square**	**DF**	**Pr > ChiSq**
Likelihood Ratio	22.3260	3	<.0001
Score	19.0079	3	0.0003
Wald	16.9582	3	0.0007

Analysis of Maximum Likelihood Estimates						
Parameter		**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr > ChiSq**
Intercept	**Never**	1	4.3136	1.5014	8.2544	0.0041
Intercept	**1-2 times per month**	1	5.0303	1.5244	10.8894	0.0010
Intercept	**1-2 times per week**	1	6.8035	1.5808	18.5240	<.0001
Resp20		1	-0.5185	0.3334	2.4192	0.1199
Resp21		1	0.6509	0.4123	2.4919	0.1144
Resp22		1	-1.2030	0.3202	14.1153	0.0002

Odds Ratio Estimates			
Effect	**Point Estimate**	**95% Wald Confidence Limits**	
Resp20	0.595	0.310	1.144
Resp21	1.917	0.854	4.302
Resp22	0.300	0.160	0.562

Next, we look at the p-values in the third box. These p-values again indicate the overall joint significance of the model. Since these p-values are all less than 0.05, we have evidence that questions 20, 21, and 22 have joint significance on question 7. We also test the individual significance of each variable within this three variable model. In order to evaluate these tests, we use the p-values in the fourth box above. The p-value corresponding to question 22 is the only one that is significant. Therefore, while the overall model is significant, it seems that question 22 is the primary contributor to this significance. In order to determine the estimated effect of question 22, we look at the odds ratio estimate.

In the proportional odds model, for each response level, we look at cumulative response options (i.e. if someone answered up to “1-2 times per week” or if they answered more than “1-2 times per week”). Because of this, our interpretation will be a bit different than before. Now, we will interpret with respect to the cumulative response options rather than individual response options. Question 22 has an odds ratio of 0.300. This means that if we increase the parent/caregiver’s response to question 22 by 1, then the odds of the parent/caregiver giving a response up to a given level are 0.3 times greater (which means the odds are actually lower).

As an example, consider two parent/caregivers who responded in nearly identical ways. However, the first parent/caregiver said “Very disconnected” to question 22 and the second parent/caregiver said “Somewhat disconnected”. The odds ratio of 0.3 suggests that the odds of the second parent/caregiver saying “Never” to question 12 is 0.3 times greater than the first parent/caregiver. Similarly, the odds ratio suggests that the odds of the second parent/caregiver saying “Never” or “1-2 times per month” is 0.3 times greater than the first parent/caregiver. Similarly, the odds ratio also suggests that the odds of the second parent/caregiver saying “Never” or “1-2 times per month” or “1-2 times per week” is 0.3 times greater than the first parent/caregiver. **In essence, as a parent/caregiver feels more connected, they are less likely to give lower responses. In other words, as a parent/caregiver feels more connected, they are more likely to check the online grade book more often.**

Question 8 Output:

We begin by testing if the proportional odds assumption holds:

Score Test for the Proportional Odds Assumption		
Chi-Square	**DF**	**Pr > ChiSq**
15.2843	6	0.0182

Since the p-value is less than 0.05, we have reason to believe that the proportional odds assumption does not hold. Therefore, we switch to the model that does not make this assumption and view those results instead.

Model Fit Statistics		
Criterion	**Intercept Only**	**Intercept and Covariates**
AIC	232.068	199.224
SC	239.823	230.244
-2 Log L	226.068	175.224

Testing Global Null Hypothesis: BETA=0			
Test	**Chi-Square**	**DF**	**Pr > ChiSq**
Likelihood Ratio	50.8444	9	<.0001
Score	51.7084	9	<.0001
Wald	24.5245	9	0.0035

Type 3 Analysis of Effects			
Effect	**DF**	**Wald Chi-Square**	**Pr > ChiSq**
Resp20	3	8.3153	0.0399
Resp21	3	3.2516	0.3544
Resp22	3	17.0392	0.0007

The first set of p-values again indicates the overall joint significance of the model. Since these p-values are all less than 0.05, we have evidence that questions 20, 21, and 22 have joint significance on question 8. We also test the individual significance of each variable within this three variable model. In order to evaluate these tests, we use the second set of p-values above. Notice that questions 20 and 22 have significant p-values below 0.05. Therefore, it appears that the three variables are jointly significant, but questions 20 and 22 are the primary contributors of this significance. Additionally, since we are not using the proportional odds assumption in this model, we can further dissect the effects of questions 20, 21, and 22 (see next page for additional output).

Analysis of Maximum Likelihood Estimates						
Parameter	**Resp8**	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr > ChiSq**
Intercept	**1-2 times per month**	1	-6.1940	2.9607	4.3767	0.0364
Intercept	**1-2 times per week**	1	-11.7103	3.6091	10.5276	0.0012
Intercept	**Daily**	1	-10.7089	3.1905	11.2658	0.0008
Resp20	**1-2 times per month**	1	1.8406	0.8622	4.5569	0.0328
Resp20	**1-2 times per week**	1	2.4972	0.8948	7.7883	0.0053
Resp20	**Daily**	1	1.8568	0.7336	6.4061	0.0114
Resp21	**1-2 times per month**	1	-1.1572	0.9669	1.4324	0.2314
Resp21	**1-2 times per week**	1	-0.6521	1.0105	0.4165	0.5187
Resp21	**Daily**	1	-1.3737	0.8761	2.4585	0.1169
Resp22	**1-2 times per month**	1	1.4522	0.7828	3.4415	0.0636
Resp22	**1-2 times per week**	1	1.9412	0.8123	5.7111	0.0169
Resp22	**Daily**	1	3.0357	0.8307	13.3538	0.0003

Odds Ratio Estimates				
Effect	**Resp8**	**Point Estimate**	**95% Wald Confidence Limits**	
Resp20	**1-2 times per month**	6.301	1.163	34.145
Resp20	**1-2 times per week**	12.148	2.103	70.176
Resp20	**Daily**	6.403	1.520	26.969
Resp21	**1-2 times per month**	0.314	0.047	2.091
Resp21	**1-2 times per week**	0.521	0.072	3.775

Odds Ratio Estimates				
Effect	**Resp8**	**Point Estimate**	**95% Wald Confidence Limits**	
Resp21	**Daily**	0.253	0.045	1.410
Resp22	**1-2 times per month**	4.272	0.921	19.814
Resp22	**1-2 times per week**	6.967	1.418	34.235
Resp22	**Daily**	20.816	4.086	106.047

The first set of p-values agrees with the results on the previous page. These p-values suggest that question 20 has a significant effect for each level of the response. These p-values also suggest that question 22 generally has a significant effect for each level of the response (we note that one of these p-values is 0.0636, making it a borderline case).

In order to analyze the effects of questions 20 and 22, we look at the odds ratios. We do not include detailed interpretations of these ratios, as they are nearly identical to the interpretations presented in the analysis of question 6. However, we do include the general interpretations:

As parent/caregivers place more importance on communicating through technology, they are more likely to check the communication portal. As they place more importance on tech communication, they are especially likely to check the portal 1-2 times per week.

As parent/caregivers feel more connected, they are more likely to check the communication portal. As they feel more connected, they are especially likely to check the portal daily.

Finally, question 9 contains categorical response options (“Phone”, “Email”, etc). These response options are simply categories and have no clear ordering. In order to model this question, we actually use the cumulative logit without the proportional odds assumption. Since this model allows the explanatory variables to have a different effect at each response level, the model works perfectly in this framework (where the response is not ordered in any way).

Question 9 Output:

Model Fit Statistics		
Criterion	**Intercept Only**	**Intercept and Covariates**
AIC	298.488	298.080
SC	311.412	349.780
-2 Log L	288.488	258.080

Testing Global Null Hypothesis: BETA=0			
Test	**Chi-Square**	**DF**	**Pr > ChiSq**
Likelihood Ratio	30.4072	15	0.0105
Score	25.4938	15	0.0437
Wald	20.2778	15	0.1615

Type 3 Analysis of Effects			
Effect	**DF**	**Wald Chi-Square**	**Pr > ChiSq**
Resp20	5	4.7584	0.4461
Resp21	5	9.6039	0.0873
Resp22	5	2.5198	0.7735

We begin by looking at the first set of highlighted p-values. These p-values correspond to the overall joint significance of the model. However, in this case, they do not seem to agree with each other (the first two are below 0.05 and the third is above 0.05). It has been established that if these p-values lead to different conclusions, then the likelihood ratio p-value is the typical choice. Therefore, we find that there is joint significance. However, we do proceed cautiously as the p-values were not nearly as significant as they have been in the other models (and they did lead to contradicting results).

Next, we move on to the individual significance of the variables within this three variable model by looking at the second set of p-values above. Note that none of these p-values are below 0.05 (though the p-value for question 21 is relatively small). Since there are no significant individual variables in this model, we further question the significance of the overall model.

Finally, we analyze the effects of each variable at each level of the response:

Analysis of Maximum Likelihood Estimates						
Parameter	**Resp9**	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr > ChiSq**
Intercept	**Teacher's communication portal (Remind, Class Dojo, Google classroom, Seesaw, classroom website)**	1	-8.0902	3.2225	6.3027	0.0121
Intercept	**Phone**	1	-5.0140	2.8811	3.0286	0.0818
Intercept	**Email**	1	-5.0041	2.0459	5.9826	0.0144
Intercept	**Through a written letter sent with my child**	1	0.3744	2.2042	0.0289	0.8651
Intercept	**In person**	1	-62.1587	5345.3	0.0001	0.9907
Resp20	**Teacher's communication portal (Remind, Class Dojo, Google classroom, Seesaw, classroom website)**	1	1.7807	0.9076	3.8494	0.0498
Resp20	**Phone**	1	0.0381	0.6054	0.0040	0.9499
Resp20	**Email**	1	-0.0873	0.3884	0.0505	0.8222
Resp20	**Through a written letter sent with my child**	1	-0.4841	0.7002	0.4779	0.4894
Resp20	**In person**	1	16.0324	1336.3	0.0001	0.9904
Resp21	**Teacher's communication portal (Remind, Class Dojo, Google classroom, Seesaw, classroom website)**	1	0.3066	0.7819	0.1538	0.6949
Resp21	**Phone**	1	0.1496	0.7647	0.0383	0.8449
Resp21	**Email**	1	1.6277	0.5979	7.4127	0.0065
Resp21	**Through a written letter sent with my child**	1	0.2068	0.8435	0.0601	0.8064
Resp21	**In person**	1	-1.6227	1.5700	1.0683	0.3013
Resp22	**Teacher's communication portal (Remind, Class Dojo, Google classroom, Seesaw, classroom website)**	1	-0.0152	0.4519	0.0011	0.9732
Resp22	**Phone**	1	0.7223	0.6151	1.3785	0.2404
Resp22	**Email**	1	-0.1141	0.3628	0.0988	0.7532

Analysis of Maximum Likelihood Estimates						
Parameter	**Resp9**	**DF**	**Estimate**	**Standard Error**	**Wald Chi-Square**	**Pr > ChiSq**
Resp22	**Through a written letter sent with my child**	1	-0.4266	0.5804	0.5402	0.4623
Resp22	**In person**	1	0.4557	1.1826	0.1485	0.7000

We find two p-values that are significant (though one of these p-values is 0.0498 and can be considered borderline). Considering the previous notes about significance, I still question if these significant results are truly significant (with the number of parameters that we are estimating, it is believable that one or two false significant results appear). I believe that it is still a noteworthy result, but I would make sure to acknowledge that the overall significance of this model is questionable as well.

In order to evaluate these two effects, we consider the odds ratios:

Odds Ratio Estimates				
Effect	**Resp9**	**Point Estimate**	**95% Wald Confidence Limits**	
Resp20	**Teacher's communication portal (Remind, Class Dojo, Google classroom, Seesaw, classroom website)**	5.934	1.002	35.151
Resp20	**Phone**	1.039	0.317	3.403
Resp20	**Email**	0.916	0.428	1.962
Resp20	**Through a written letter sent with my child**	0.616	0.156	2.431
Resp20	**In person**	>999.999	<0.001	>999.999
Resp21	**Teacher's communication portal (Remind, Class Dojo, Google classroom, Seesaw, classroom website)**	1.359	0.294	6.291
Resp21	**Phone**	1.161	0.259	5.199

Odds Ratio Estimates				
Effect	**Resp9**	**Point Estimate**	**95% Wald Confidence Limits**	
Resp21	**Email**	5.092	1.578	16.437
Resp21	**Through a written letter sent with my child**	1.230	0.235	6.424
Resp21	**In person**	0.197	0.009	4.282
Resp22	**Teacher's communication portal (Remind, Class Dojo, Google classroom, Seesaw, classroom website)**	0.985	0.406	2.388
Resp22	**Phone**	2.059	0.617	6.875
Resp22	**Email**	0.892	0.438	1.817
Resp22	**Through a written letter sent with my child**	0.653	0.209	2.036
Resp22	**In person**	1.577	0.155	16.016

In order to interpret the odds ratios, we acknowledge that “Other” is our reference group.

The odds ratio for question 20 and teacher’s portal is 5.934. This means that if we increase the parent/caregiver’s response to question 20 by 1, then the odds of the parent/caregiver using the portal (compared to “Other” means) are 5.934 times greater. As an example, consider two parent/caregivers who responded in nearly identical ways. However, the first parent/caregiver said “Not important” to question 20, while the second parent/caregiver said “Somewhat important” to question 20. The odds ratio of 5.934 suggests that the odds of the second parent/caregiver using the portal (versus “Other” means) is 5.934 times greater than the first parent/caregiver. We can make similar interpretations between (“Somewhat important” and “Important”) and (“Important” and “Very important”). **In essence, as parent/caregivers place**

more importance on communicating through technology, they are more likely to use the portal (instead of the "Other" category).

The odds ratio for question 21 and email is 5.092. This means that if we increase the parent/caregiver's response to question 21 by 1, then the odds of the parent/caregiver using the email (compared to "Other" means) are 5.092 times greater. As an example, consider two parent/caregivers who responded in nearly identical ways. However, the first parent/caregiver said "Strongly disagree" to question 21, while the second parent/caregiver said "Neutral" to question 21. The odds ratio of 5.092 suggests that the odds of the second parent/caregiver using email (versus "Other" means) is 5.092 times greater than the first parent/caregiver. We can make similar interpretations between ("Neutral" and "Agree") and ("Agree" and "Strongly agree").

In essence, as parent/caregivers view communicating through technology more positively, they are more likely to use email (instead of the "Other" category).

One of the notes from the original analysis still holds true here. We repeat this note:

> We created a considerable number of unadjusted p-values in this report, which could lead to a potential multiple testing problem. Multiple testing effectively means that you to have a better chance of finding significant results incorrectly (If you generate 100 p-values, you are likely to find by chance at least one that is significant). If you choose to use these p-values in your own report, then it is strongly encouraged that you acknowledge that these are raw, unadjusted p-values. Alternatively, if you'd like, we can make p-value adjustments that account for the considerable number of p-values that we generated (and you can report the results based off the adjusted p-values). However, at this point, we simply wanted to report the raw p-values.

APPENDIX N

DISTRICT GRADE BOOK PORTAL INVOICE

Invoice

REMIT TO
Carbon Lehigh Intermediate Uni
4210 Independence Drive
Schnecksville, PA 18078

NO. 18000371
Date 09/08/2017
Fund Enterprise Fund

TO
School District
Business Office

Date	Customer Number	Cust PO Num	Invoice Description
09/08/2017	SD		PowerSchool

QTY	DESCRIPTION	U/M	UNIT COST	Amount
2,100.00	PowerSchool Hosting and Support Contract Fee 07/01/17 - 06/30/18	STUDEN	12.750	26,775.00

Note: Total 26,775.00

TERMS & CONDITIONS

1. Make check payable to:

Carbon Lehigh Intermediate Unit #21

2. Please remit within 30 days to:
Lucille K. Gallis
Director of Business Services

ACCOUNT DISTRIBUTION

0606999608	26775.00

RETURN WITH PAYMENT

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